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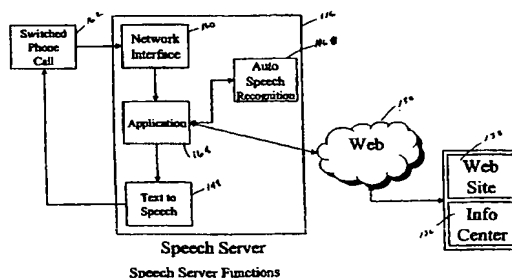
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(54) Title: SYSTEM, METHOD, AND BUSINESS MODEL FOR SPEECH-INTERACTIVE INFORMATION SYSTEM HAVING BUSINESS SELF-PROMOTION, AUDIO COUPON AND RATING FEATURES



(57) Abstract: The invention provides a system, method, and business model for an information system and service having business self-promotion, audio coupon, ratings, and other features. A business or organization in which consumers call into a service using an ordinary telephone, PC, PDA, or other information appliance, and make requests in plain speech for information on goods and/or services, and the service provides responses to the request in plain speech in real-time. Provides an operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, including database provider storing merchant information; an interface for inputting merchant information into the database and for retrieving and editing the information; and an interface for inputting voice commands and data and for receiving merchant information and processed information from the database in response to the input voice commands and data. The invention provides a system including: a speech-to-text conversion engine converting speech-based input commands and data received from an external device over a communication link into text-based commands and data; a data base storing a plurality of data items; a search engine searching the database for a particular data item in response to the text-based command and data; a text-to-speech conversion engine generating a speech-based representation of the particular data item identified in the database search; and a speech server for communicating the speech-based representation of the particular data item to the external device.

**SYSTEM, METHOD, AND BUSINESS MODEL FOR SPEECH-
INTERACTIVE INFORMATION SYSTEM HAVING BUSINESS SELF-
PROMOTION, AUDIO COUPON AND RATING FEATURES**

Field of Invention

This invention pertains generally to voice-based or speech-based interactive electronic commerce, and more particularly to systems, methods, and methods of doing business for providing automated interactive information from a business or organization to a consumer in need of goods and/or services. The invention pertains even more particularly to systems, methods, and methods of doing business for providing automated speech driven query and response with business or event self-promotion features relative to businesses and events over ordinary wired or wireless telephone systems, PC systems, Personal Data Assistants (PDAs), and other communication and information appliances and devices.

BACKGROUND

Locating business establishments, such as for example a restaurant satisfying the particular need, has hereto for generally required access to printed directory listings, or more recently access to the World Wide Web using a personal computer. The availability of such references is frequently quite limited at the time the consumer desires to avail themselves of particular goods or services. For example, an out-of-town visitor driving in their automobile and approaching San Francisco might decide to stop and have dinner in a fine Italian restaurant and more particularly might like to have dinner in a fine Italian restaurant located in the particular area of the city. That visitor would likely not have a printed directory in their automobile or mobile access to the internet to search for a restaurant satisfying their current need. Therefore, the visitor would likely either have to stop and asked for recommendations or drive around until a restaurant satisfying their needs had been located. This is clearly inefficient, and the

visitor may not have the dining experienced a expected if the restaurant they happen to see well driving turns out to have poor quality food, poor service, or both.

An analogous dilemma arises for other goods and services, whether provided to the local residents or to a visitor. Frequently information is not available to a consumer when he or she needs such information, and with the proliferation of a fast mobile lifestyle, there exists and need to provide such consumer information with readily available information appliances, such as conventional telephones, site other phones, or other pocket or mobile devices that can provide connectivity to a service at minimum cost.

10 Frequently such device will have only sparse input/output capabilities. For example, a cellular telephone will typically have only a few display lines presenting text or symbolic data to a user, but has substantial audio input and audio output capability that can be used by the consumer.

Heretofore, speech-to-text conversion has generally been limited to word processing and or computer or control applications as the has required fairly substantial processing power and memory within a computer device. For example, speech to text conversion products made by Dragon Systems generally require an Intel Pentium II or III microprocessor running in excess of 450 MHz and 128 MB of memory. This technology is not available in conventional or mold will telephones at this time. Text-to-speech conversion has been known but has not been utilized to provide an interactive interface between consumers and consumer information from telephone systems.

Furthermore, even for systems which provided some degree of consumer information over the telephone, such systems have either not attempted to generate business revenues through their operation, or have been unsuccessful in generating significant revenue in this manner. In part the lack of revenue success has been due to a low level of business participation in such systems, the inability of a business to control or modify their message in response to short-term business needs or to sell promote their businesses, as well as the lack of a particular incentive for a consumer to par take all of the information offered by the service. In fact, there may frequently have been a cost associated access to conventional information and referral services by consumers, even if only by virtue of the directory assistance by local telephone service providers.

Some conventional systems and methods have been limited to playback of recorded audio or audio playback corresponding to the content of web pages; but such systems have not integrated internet or web-based interactions with voice or telephone based information provision.

5 Therefore, there remains a need for a method of doing business, an information and referral service providing easy access by businesses and consumers, as well as providing business self promotion and consumer feedback features that encourage use, generate revenues, and provide incentives for use by both businesses and consumers.

10 SUMMARY

 The invention provides a system, method, and business model for an information system and service having business self-promotion features. In one aspect, the inventive business model is directed to a business in which consumers call into a service using an ordinary telephone, PC, PDA, or other information appliance, and
15 make requests in plain speech for information and positive referrals on goods and/or services, and the service provides responses to the request in plain speech in real-time over the same telephone, PC, PDA, or other information appliance. The business model may further include providing a facility for a business to communicate a self-promotion of the business to the requestor, as well as providing an audio promotional coupon (or
20 other promotional item) to a requestor when the requestor completes a call to a business using the service.

 In another aspect, the invention provides an operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, comprising: an information database provider storing
25 merchant information; a merchant interface for inputting merchant information into the database and for retrieving and editing the information; and a consumer interface for inputting voice commands and data and for receiving merchant information and processed information from the database in response to the input voice commands and data. The operating method may provide that the consumer interface comprises a
30 telephone handset, and/or that the consumer also inputs non-voice commands and data from a keypad on the telephone handset. The operating model may also provide that the telephone handset comprises a mobile telephone.

In another aspect, the invention provides a system comprising: a speech-to-text conversion engine converting speech-based input commands and data received from an external device over a communication link into text-based commands and data; a data base storing a plurality of data items; a database search engine searching the database for a particular data item in response to the text-based command and data; a text-to-speech conversion engine generating a speech-based representation of the particular data item identified in the database search; and a speech server for communicating the speech-based representation of the particular data item to the external device.

In another aspect the invention provides audio coupons that operate as incentives for consumers to use the inventive system. In still another aspect, the invention provides system and methods for submitting and retrieving ratings for goods and/or services.

The invention also provides methods, computer software, and computer software program products that interoperate with the inventive systems and methods.

BRIEF DESCRIPTION OF THE DRAWINGS

Additional advantages and features of the invention will become readily apparent upon reading the following detailed description and appended claims when taken in conjunction with reference to the following drawings, in which:

FIG. 1 is a diagrammatic illustration showing an exemplary embodiment of the inventive system.

FIG. 2 is a diagrammatic illustration showing an exemplary embodiment of speech server functionality.

FIG. 3 is a diagrammatic illustration showing an exemplary embodiment of a new business user (merchant) interaction with the inventive system.

FIG. 4 is a diagrammatic illustration showing an exemplary embodiment of an existing registered business user interaction with the inventive system.

FIG. 5 is a diagrammatic illustration showing an embodiment of a general consumer user interaction with the inventive system.

FIG. 6 is a diagrammatic illustration showing an exemplary implementation of the inventive directory service on the Web

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

FIG. 1 shows the high level system architecture 102 and consumer user (or caller) 101 access points for a preferred embodiment of the invention. A cellular phone 106 (or other wireless device), standard telephone 118, either an analog (POTS) or digital, can be connected to the architecture 102 using a standard telecommunication link 120, such as a standard telephone line 122, ISDN line 124, cable 126 or DSL line 128. For a cellular phone 106, it is understood that there is a cellular base station 108 and a cellular switch 110 interposed between the cellular telephone 106 and the PSTN 112. The incoming call 130 from the cell phone 106 or the telephone 118 goes through a PSTN 112 and telephone switch 114 and gets picked up by the Speech server 116, which is connected on one side 117 to the telephone switch 115, and on the other side 119 to a computer network 130 such as for example the Internet.

The user (or caller) 101 can access the information or data 132 that resides in a database 134 within the Information Center 136 and the Web Site 138 through interactive voice commands 140 and/or through keypad presses 142 on the caller's 101 device, such as on the cellular telephone 106 or standard wired telephone 118. In a preferred embodiment of the invention, only the caller's voice commands are used. The caller's voice commands 140 are recognized and translated into one of the variations of Voice Extensible Markup Language (VXML, VoiceXML, or VOXML) commands 144 by the Speech Server 116 using a speech-to-text conversion engine 146 and once translated into VXML are used to retrieve the information 132 from the Information Center 136 database 134. VXML is an extension or elaboration on the XML (Extensible Markup Language) standard known to workers in the art and not described in greater detail here. Information concerning the VXML Forum is available on the world-wide-web at <http://www.vxmlforum.org/> and Version 1.0 of the VoiceXML specification dated 07 March 2000 which is hereby incorporated by reference is available in Adobe Acrobat format at <http://www.vxmlforum.org/specs/VoiceXML-100.pdf>.

Once the data 132 is retrieved and transmitted back to the Speech Server 116, the text information from the data 132 is converted to speech using a text-to-speech conversion engine 148 within the speech server 116 and played back to the caller 101 using the caller's device 106, 118. Speech server 116 also generates and plays back (presents) pre-recorded or synthesized menu commands 150 to the caller. The system

architecture connects 102 the information database 134 to the Internet 130 (or other local or global network of computers and/or information appliances) which can also be accessed with a display device 152 such as a personal computer (PC) equipped with a modem 154 (wired or wireless), a smart phone 156, a PDA or palmtop device 158 or
5 any computer or other information appliance or device that can be connected to the Internet (or other local or global network) with the ability to display standard Hypertext Markup Language (HTML) pages or other formats interpretable by the computer 152.

It is noted that although reference is made to several current industry standard data and information formats and protocols, such as HTML, XML, and VXML, the
10 inventive structure and method are not limited to these particular formats and/or protocols or to the versions of these protocols in existence at the time the invention was made as those workers having ordinary skill in the art will appreciate the capabilities and features provided by these formats and protocols may be provided in other ways and that future versions of these formats and protocols will also support the inventive
15 structure and method.

Embodiments of the inventive system may desirably incorporate and utilize natural language speech recognition. In such implementations, the user can naturally speak and the system interprets the user's speech to extract the request or inquiry. The provides additional flexibility for a user as that user does not need to know any
20 particular commands or request rules or syntax. Natural speech processing and artificial intelligence are known in the art and not described in greater detail here.

FIG. 2 shows an embodiment of Speech Server 116 and its functional connectivity to receive a switched telephone call and to interact with the internet 130. Speech Server 116 performs several tasks such as the task of providing a Network
25 Interface 160 to the analog or digital phone network that provides the switched phone call 162, Automatic Speech Recognition (ASR) 146 or speech-to-text conversion (STT), Text-to-Speech conversion (TTS) 148, runs the application or application program 164 that control and manages the phone calls 162 and the Interactive Voice Response (IVR) 166. IVR refers to the interactive voice response which is
30 conventionally a menu driven response provided in response to an input. A user is asked to say something (for example, "Press or say 1 for marketing, press or say 2 for research", etc.) However, the inventors are not aware of any such conventional systems

that provide ASR or text-to-speech in connection with IVR. In one embodiment of the invention, the Speech Server 116 is a personal computer equipped with Dialogic Antares automatic speech recognition boards and other products. Information regarding the Dialogic Antares boards are available from Dialogic Corporation, 1515 Route Ten,
5 Parsippany, NJ 07054-4596 USA and on their web site at http://www.dialogic.com/products/indx_abp.htm.

Operation of the exemplary Speech Server in the system is now described. The incoming call 162 is answered by a network interface card 160, such as for example a Dialogic network interface card (analog or digital). A prompt is played to the caller 101
10 over the caller's device 106, 118 asking the caller to say the selected item 170 from the available selections on a voice or audio menu. When the caller responds to the request, the application 164 passes the voice data to the auto speech recognition block 146, such as may be provided by a Dialogic Antares™ board loaded with an Automatic Speech Recognition (ASR) software. ASR software is available from several sources,
15 including for example from Lernout & Hauspie (L&H) (LERNOUT & HAUSPIE Burlington, MA, Phone: 1-781-203-5000, Fax: 1-781-238-0986, <http://www.lhs.com>) or SpeechWorks (SpeechWorks International, Inc., 695 Atlantic Avenue, Boston, MA 02111, Tel: 617.428.4444, Fax: 617.428.1122, <http://www.speechworks.com>).

A Dialogic Antares board-based automatic speech recognizer (speech-to-text)
20 146 translates the voice data into ASCII text (or another code or symbols) that identifies the spoken words and returns a text or other symbolic representation of the results to the application 164. The application 164 accesses, via for example a T-1 line or faster Internet connection, the database 134 of the Information Center 136. Real-time (or near-real-time), active vocabularies are generated at run-time using the database's 134 ASCII
25 text or symbols. The application uses the ASCII text from the database 134, passes it to a second Antares board 148 running a text-to-speech (TTS) algorithm. The TTS algorithm generates the final voice or audio information that is played to the caller 101.

FIG. 3 shows an example of the general flow of new business user (new merchant) 201 interaction with the inventive system and method according to one
30 embodiment of the invention. A business user 201 is a user that is providing goods or services to consumers 101 where consumers also refer to the previous caller 101. The business user is desirous of having their goods and services made available to

consumers over the inventive system and in promoting their goods and services to consumers.

Once the business user 201 calls, and gets identified as a new business user utilizing a business user registration procedure (see FIG. 5) the business user 201 is asked to say certain business registration information 202, including for example their name 204, name of the business 206, phone number 208, credit card number 210, and/or other pertinent business information 210. Once the registration information 202 is obtained, the system 102 compares the information provided by the new business user 201 with the information that resides in the database 134. The database includes information regarding business so that the authenticity of the attempted registration can be verified with reasonable assurances. In the even that the information does not match, the system 102 may connect to other databases in an attempt to verify the authenticity or otherwise complete the registration. If the information matches, the user registration is completed. If the information does not match, the user is notified with a message providing the new business user with additional options or information, or to recommend trying to say the information again. For example, in one embodiment of the invention, the new business user is prompted with the audio message "Sorry, but the information you have provided does not seem to be correct, say 'again' to start over. You can also hang up and call again, say 'help', or register at our web site www.Talk411.com".

Once the new business user 201 is registered and a password 212 is issued to the business user, then he or she is requested to record a short message 214 that will be heard by the callers 101 who request the business user's phone number 216. Voice recognition can be used (in conjunction with a previously stored authentic voice print of the business user) to authenticate the business user 201 in addition to or instead of the password 212 depending on the quality of the speech recognition technologies used and the quality of the line or other communication link connecting the business user to the system at the time. So called "caller identification" available in some areas may also assist in verifying the identity of the business user where the business user would then be required to call from a registered telephone number.

Once the business user approves the short message 214 just recorded, the recorded short message is published 216 then he or she is requested to provide an

additional longer message 218 that may be or include a special promotion 220, directions to the business location 222, or any other information 224 that will provide additional information to the callers. Both of these short message 214 and long message 218 are available for playback to callers (see FIG. 4) and can also be viewed in text form by those who visit the web site 138 and look up that particular business. The new business user can change either message 214, 218 completely over the phone, or edit it word by word on the PC connected to the web site (see FIG. 4)

It is noted that the messages provided by the business may either be a representation of the business representatives own speech which is preferred so that the quality and character of the voice is maintained, or the message may be computer synthesized speech. The later being necessary if the business chooses to provide or later modify the message using text input on a computer. As maintaining original speech may be somewhat cumbersome, additional fees may be levied on the business for providing actual speech as compared to synthetic speech. Alternatively, the business user may be able to select from a set of available synthesized voice types so that the voice, even though not provided by the business directly, provides the intended feeling or emotion associated with the business. For example, a restaurant may wish to convey the feeling of romance.

Having described the general operation of the system during a new business interaction, we now describe one particular exemplary embodiment of the new business interaction procedure relative to the flow chart in FIG. 3. Procedure is executed when a determination is made that the business user calling is not a registered business user and a new account needs to be established. As illustrated in FIG. 4, the business user calls the decision is made as to whether the calling business user is a new user or in existing user. Once it is determined that a new account needs to be established, registration of the new business account proceeds as described above wherein the calling business user provides certain business registration information register the new account (Step 302). The registration information provided by the registering new business user must be verified before the new business user interaction can continue. If verification cannot be made, then the interaction is terminated (Step 306), otherwise the business user is prompted to record a short message (Step 308). The business user can then approve the recorded short message 214 or change the recorded short message

until the business user is satisfied with the recorded short message and approves it for publication (Step 310) at which time the short message is published in a voice form and in text form on web site 134 (Step 312).

Business user 201 is then prompted to optional record either no message, and
5 long message 218, or sponsor message 219 (Step 314). Event that the business user to record no additional messages, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336). If the business user chooses to record a long message then the business user records the long message (Step 316) and is given an opportunity to approve the recorded message or change that
10 message until the business user is satisfied with the recorded long message (Step 318). The long message is published (Step 320) and the business user is again given the opportunity to learn about category sponsorship (Step 322). If the business user declines the opportunity to learn about category sponsorship, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step
15 336). On the other hand, if the business user indicates a desire to learn about category sponsorship he or she is provided with the description of the sponsorship service (Step 324) and again asked if he or she wishes to subscribe to the category sponsorship service (Step 326). A category sponsorship message is a message that will come up when the caller requests businesses in a category without a specific business name in mind.
20 Then the system will play back the message of the sponsors in that category in a pre-determined order, random order or a dynamically defined order (see explanation relative to the general user interaction of FIG. 5). If the business user declines the opportunity to subscribe, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336). If the business user indicates a
25 desire to subscribe, he or she is given an opportunity to record a category sponsorship message (Step 328) and further opportunities to either approve or change the message until he or she is satisfied with the recorded category sponsor message (Step 330). The category sponsor message is then published (Step 332) and the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336).

30 As illustrated in the flow chart diagram of FIG. 4, the procedures associated with the repeat business user interaction are substantially the same as, though not identical to, those just described for a new business user interaction. The differences

primarily concerned how the initial phase of the business user call to the system is handled. For in existing registered business user interaction, the system receives the business user call and determines if it is a new user or an existing registered user (Step 352). If the system determines that it is a new business user, than the procedure already
5 described relative to FIG. 3 is executed. However, if the system determines that an existing registered business user is calling into the system, it presumed step the existing business user wishes to make changes to one or more of the items of registration information or to one or more of the recorded messages (Step 354). If the business user decides after placing the call that he or she does not wish to make changes than the
10 interaction terminates (Step 356), otherwise the business user is asked whether he or she wishes to change the s tune hort message, the long message, or the sponsor message (Step 358) and given opportunity to change one or more of these messages. These messages are the Long, Short and Sponsor messages that he may have already input into the system via a phone or a personal computer of other information appliance. The
15 process for recording, changing, approving, and publishing each of these messages is the same as already described relative to FIG. 3, and the business user it is similar given additional opportunities to learn about, subscribe to, and record messages pertinent to additional services provided by the system.

In order to make the user interface more satisfactory, additional steps can be
20 introduced or some of the shown steps can be deleted from the interaction flow. For example, after the Business User makes changes to the short message, he can be prompted to see whether he wants to make any changes to the long or the sponsor messages. An example of the deletion of a step can be where the user is initially prompted to find out whether he wants to make changes and gets told that he can say
25 anytime "make changes" and trigger the menu options. The amount of consolidation largely depends on the speech recognition technologies employed and the key words chosen for the speech recognition vocabulary.

In addition, other embodiments of the invention may largely or entirely eliminæ
the particular command and data extraction procedure set forth in the above described
30 procedures and replace them in all or in part by a natural language recognition and extraction procedure that either listens to the user's request in free form speech and extracts commands and/or data from the user's speech, or extracts the commands and/or

data in part and intelligently asks additional questions of the user for any added information. In this sense, the inventive system and method provide logic for conducting a dialog or conversation with the caller. Essentially the same or substantially the same information is exchanged between the user and the system but
5 with a more flexible interface that is more familiar and enjoyable to the user.

Those workers having ordinary skill in the art in light of the description provided here will appreciate that the procedures described for existing registered users as well as for new business users may be modified to provide somewhat different options at each stage all the interaction or to provide different ordering of the options.
10 Therefore, the interaction described here are merely exemplary of the type of business user to system interaction desirable in an implemented system, but does not limit the inventive system or method to these particular interaction schemes or procedures.

FIG. 5 shows an exemplary embodiment of the General User interaction 402. Once the consumer user 101 calls, a greeting message 382 is played back (Step 404)
15 such as "This is TALK411, your best source for local information" followed by a sponsor message 384, such as for example "brought to you by Dialsurf, bringing the web to your phone" (Step 406). This sponsor message is typically a paid message by a sponsor. Then the voice menu 386 is played back to the caller (Step 408), such as "Please say your selection: Restaurants, Lawyers, Auto dealers, etc.". Once the
20 consumer user says one of the menu items (Step 410), then he or she is prompted with a request message (Step 412), such as "Say the name of the business or say 'select'".

If the consumer user 101 says "select" or another word that indicates to the system that he or she (the consumer user) should be prompted with a list of pre-selected business names, he or she is prompted with a request to specify selection criteria (Step
25 414). This criteria 388 is pre-determined and varies according to the type of business. In the case of restaurants for example, it may be "type of cuisine, city and zip code". In case of lawyers, it may be for example "type of practice, city and zip code". Once the user says the criteria 388, then the system 102 tries to match the requested category or criteria 388 to the closest category or criteria stored in the database 134. If the match
30 is good (according to some predefined rules or decision algorithm or procedure), then the system will play back a number of business names pre-determined by the system (Step 418). These names can be picked from the database 134, in the requested

category, in a pre-determined fashion, randomly or based on a dynamically changing criteria or some fixed set of rules.

The inventive system, method, and business model or operating method is applicable to a broad variety of business and merchant types including but not limited
5 in any way to: restaurants, physicians and surgeons, auto parts, auto repair and service, pizza, auto dealers, department stores, attorneys/lawyers, dentists, hospitals, insurance, beauty salons, banks, plumbing contractors, florists, as well as many other types of businesses and services.

One example of pre-determined way is for the subscribed businesses to pay the
10 corresponding fees to be included in the top category (Category #1), second category (Category #2), and the like for a specific time period. An example of random procedure can be, as the name implies, based on a random number generator that picks a database record in the category requested. An example of dynamically changing criteria is when users rate the businesses on a real time or periodic basis and which ever business is
15 rated highest gets to be heard as the #1 (first named), #2 (next named), #3 (third named), and the like down a hierarchical list.

After the pre-selections are played back, the caller is invited to say the 'number of the menu selection' or to say 'more' (Step 454), if the caller responds with the number of the selection, the number and a short message is played back (Step 450) and
20 he or she gets prompted with a questions such as "Say connect or 'more' for additional information" (Step 452). If the caller says "connect", the caller is connected to the phone number that was found (Step 444). If the caller says "more" (Step 436) then the pre-recorded Long Message is played back (Step 438) with a question such as "Say connect or just hang up your phone" (Step 440). Based on the caller's selection, either
25 the caller gets connected to the phone number (Step 444), or gets disconnected to the service (Step 446). Of course, different rules may be applied to permit the user to input different choices, however, in some situations it is desirable to have a user call in again when they have rethought their need rather than to tie up the connection for an extended period of time.

30 If the caller responds by saying 'more', then additional pre-selections are played back to give the caller more and different choices (Step 456). The caller may then either say the number of one of the new selections (Step 458) or terminate (Step 446).

In some instances, the caller may be permitted to keep repeating the request for more choices until all choices available in the data base (or a predetermined number of such choices) have been presented to the caller. In either event, if the caller does not like or select one of the available choices, the call terminates (Step 446).

5 If there is no match (Step 420), an answer such as "sorry, but we cannot find this category in our list, try again" is played back (Step 422). After a predetermined number of tries (for example, after two tries) if there is no match, the system will say something like "sorry, we could not find a business that matches your request, please call us again" (Step 424) and terminate the call (Step 426). If there is a close match,
10 the system will play back the match to verify the request for further action (Step 428).

 Once the caller chooses the business by saying its name or menu number (Step 430), the number and a short message is played back (Step 450) and he or she gets prompted with a questions such as "Say connect or 'more' for additional information" (Step 452). If the caller says "connect", the caller is connected to the phone number that
15 was found (Step 444). If the caller says "more" (Step 436) then the pre-recorded Long Message is played back (Step 438) with a question such as "Say connect or just hang up your phone" (Step 440). Based on the caller's selection, either the caller gets connected to the phone number (Step 444), or gets disconnected to the service (Step 446).

20 If the caller says the name of a particular business instead (Step 448), then the phone number and the Short Message (refer to FIG. 3) will be played back (Step 450) with an additional prompt (Step 452), such as "Say 'connect' or 'more' for additional business information (the Long Message per FIG. 3). Once the Long Message is played back (Step 438), the user will be prompted once more whether the connect or terminate
25 the call (Step 440).

 FIG. 6 shows the implementation of the Directory Service of the info center 136 on the Web 130, where the Web Server 471 serves VXML or HTML/XML pages 470, the LDAP Server (Lightweight Directory Access Protocol Server) 472 runs over TCP/IP and provides quick response to high volume lookup to the Database 473. The
30 Middleware 474 is the layer of software that integrates operations of the Web Server, LDAP Server, and the Database (or any additional software such as Transaction

Server). LDAP Servers and operation are known in the art, and is described, for example as of 23 March 2000, at:

<http://www.umich.edu/~dirsvcv/ldap/doc/guides/slapd/1.html>.

5 An example of a Web Server for high volume application such as TALK411 is the Microsoft Internet Information Server (IIS). Microsoft IIS runs on Windows NT Server. LDAP also runs on Windows NT® 4.0 using Service Pack 4 or later, Windows® 2000, or Windows 95/98. All systems desirably have TCP/IP (or an equivalent capability) installed. Additional information relative to Microsoft products, including Microsoft IIS is available on their website as of 23 March 2000 at
10 http://msdn.microsoft.com/isapi/msdnlib.idc?theURL=/library/psdk/ldap/ld_about_7euh.htm

Other optional but desirable features may also be provided. For example, one desirable promotional feature involves issuing an audio coupon to a consumer user of the inventive system. In one embodiment, a consumer user is issued an audio coupon entitling the user to a promotion. Typically, such promotion would entitle the user to
15 a discount to be applied to the item or service purchased when the consumer user connects using the inventive system and method. This discount, for example 10 percent off, would only be available to the consumer user when using the inventive TALK411 system and is therefore an enticement for a consumer user to use the inventive system rather than dealing with the business through conventional means. Other promotions
20 might involve a buy one get one free offer, of free drink with order of food type offer, or any other the other variety of promotional offers typically made in the retail trade between merchants and consumers.

The audio coupon may be provided in a variety of ways. For example, the business would become aware that the consumer user contacted the business using the
25 inventive TALK411 system and automatically give the consumer user a discount (or other promotional item) when the your was placed. Alternatively, the consumer user might be given a coupon code which could only be available to a consumer user who ate utilize the inventive system, and a consumer user would provide this code to the merchant upon connection. This code might be generic to the business or particularized
30 to that specific transaction. Therefore, in addition to be self promotion aspects of the business model, the optional use of audio coupons also provides considerable business advantages. In one embodiment of the invention, the system inserts a message to the

merchant after the call has been connected to identify the caller as a valid service user and to validate the audio coupon.

In a preferred embodiment, the use of audio coupons is integrated with the world wide web or internet in that the audio coupons may be identified, stored to, retrieved
5 from, or otherwise processed using the businesses or the inventive services web site. In this way, the consumer user is not limited to using the coupon at the time it was earned, but may instead be collected for later redemption. This also affords an opportunity to obtain a printed copy of the coupon for use at any later time.

In yet another embodiment, the audio coupon or a coupon derived from that
10 coupon may be delivered to a personal data assistant (such as for example, an email enabled PALM VII) so that the PDA stores the coupon and serves as a medium for displaying the coupon the business, merchant, or organization.

Independent of how the coupon is delivered, one aspect of the inventive system, method, and business model is to collect money or other revenue in what ever form for
15 each coupon delivered. It is also advantageous to collect money or other revenue for each coupon redeemed either as a fixed amount per coupon or as a portion (such as a percentage) of the sale, or both. Collection of revenue for each coupon delivered is separate from collection of revenue for each redemption or sale.

In a further embodiment, the system has geographical context provided by a
20 known location of the caller. For example, it is expected that mobile or cellular telephones will have capability to self locate, either using internal satellite-based Geographical Positioning System (GPS) means or by using various schemes known in the art for determining (or estimating) the location of a cellular telephone based on proximity to cellular base stations, hand-off's to base stations, and similar techniques.
25 In any event, the inventive system provides for geographically-based recommendations, geographically-based promotions, as well as for geographically based audio coupon delivery. Here the geographic proximity may be established according to some set of rules which may for example depend upon the density of business establishments in the local area. However, in one embodiment the geographically directed audio coupons
30 pertain to business within one to a few blocks of the callers location, in other embodiments to a mile or two, and in still other embodiments to the region of the city or town.

In yet another optional feature, consumer user's who call into the inventive service will be able to rate the particular business after they have utilized the businesses goods or services. For example, a consumer user having been referred to a restaurant using inventive system can later call in using a toll-free or free local phone number and provide feedback, such as in the form of a rating, relative to their experience. These ratings would then be compiled and made available to the local businesses. Hopefully such feedback would encourage the businesses to either maintain their high quality of service or to improve the quality of their service and/or goods in response to the consumer user's rating. In another embodiment, these ratings were also serve as an additional information source for consumer user's and would be available either or telephone or on Internet based website. The business establishment having demonstrated a particularly high-level of goods or service based on these ratings would be placed into a category of highly rated businesses, such as "BayHits", would be available to the consumer user during his or her call into the system. So for example, when the user calls in to request "Italian restaurant in Palo Alto", if in one of the candidate restaurant played back to the caller happens to be a "BayHit" then that restaurant would be indemnified as such. For example, the caller might receive a message "Il Fornaio - a BayHit". Alternatively, consumer user may be able to request "BayHit Restaurants" and receive only a list of restaurants satisfying the BayHit criteria.

In some embodiment of the invention, the rating or BayHit feature may be provided free to the businesses while in an alternative preferred embodiment businesses falling within the highly rated or "BayHit" category would be charged the nominal fee. Those workers having ordinary skill in the art in light of description provided here will appreciate that this rating and promotion scheme may be implement in a variety of ways and that the particular descriptions provided here are merely exemplary of the more general method. The ratings may alternatively or additionally be provided on an Internet website (such as <http://www.bayhits.com> so that information obtained from caller's using inventive system method would be available to other individuals and businesses as well.

Some of the steps in this procedure can be changed, left out, or combined to make the user interaction to be a satisfying experience as will readily be understood by workers having ordinary skill in the art in light of the description provided here.

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The
5 embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims appended hereto and their equivalents. All publications and
10 patent applications cited in this specification are herein incorporated by reference as if each individual publication or patent application were specifically and individually indicated to be incorporated by reference.

CLAIMS

1. An operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, comprising:
 - 5 an information database provider storing merchant information;
 - a merchant interface for inputting merchant information into said database and for retrieving and editing said information; and
 - a consumer interface for inputting voice commands and data and for receiving merchant information and processed information from said database in response to said
 - 10 input voice commands and data.
2. The operating method in claim 1, wherein said consumer interface comprises a telephone handset.
3. The operating model in claim 2, wherein said consumer also inputs non-voice commands and data from a keypad on said telephone handset.
- 15 4. The operating model in claim 2, wherein said telephone handset comprises a mobile telephone.
5. A system comprising:
 - a speech-to-text conversion engine converting speech-based input commands and data received from an external device over a communication link into text-based
 - 20 commands and data;
 - a data base storing a plurality of data items;
 - a database search engine searching the database for a particular data item in response to said text-based command and data;
 - a text-to-speech conversion engine generating a speech-based representation of
 - 25 said particular data item identified in said database search; and
 - a speech server for communicating said speech-based representation of said particular data item to said external device.
6. The system in claim 5, further comprising the external device, wherein said
- 30 external device comprises a voice/speech input device.
7. The system in claim 5, further comprising the external device, wherein said external device comprises a telephone.

8. The system in claim 5, further comprising the external device, wherein said external device comprises a device selected from the group consisting of a personal computer, notebook computer, personal data assistant (PDA), information appliance, or combination thereof.
- 5 9. The system in claim 5, wherein said communication link comprises the internet.
10. The system in claim 5, further comprising means for communicating and validating a promotional audio coupon.
11. The system in claim 5, further comprising means for receiving rating inputs from users and for providing processed ratings inputs to consumers.
- 10 12. A business model for a business in which consumers call into a service using an ordinary telephone and make requests in plain speech for information and positive referrals on goods and/or services, and the service provides responses to the request in plain speech in real-time over the same telephone.
13. The business model in claim 12, further including providing a facility for a business to communicate a self-promotion of the business to the requestor.
- 15 14. The business model in claim 12, further including providing an audio promotional coupon to a requestor when the requestor completes a call to a business using the service.
15. The business model in claim 12, further including providing an audio promotional coupon to a requestor when the requestor completes a call to a business using the service.
- 20 16. A method comprising:
- receiving a speech utterance from a user from a communication device;
- converting the speech utterance to text and extracting commands and optional
- 25 data from said converted text;
- searching a database for a particular data item in response to said text-based command and data;
- generating a speech-based representation of said particular data item identified in said database search; and
- 30 serving said speech-based representation of said particular data item to said communication device.

17. The method in claim 16, wherein said communication device comprises a voice/speech input device.

18. The method in claim 16, further comprising communicating and validating a promotional audio coupon to the user at the time said speech-based representation is served to said communication device.

19. The method in claim 16, further comprising receiving rating inputs from users and for providing processed ratings users in response to said speech utterances..

20. The method in claim 16, wherein said received speech utterance comprises natural human speech, and said converting comprises natural language speech processing to extract said commands and data.

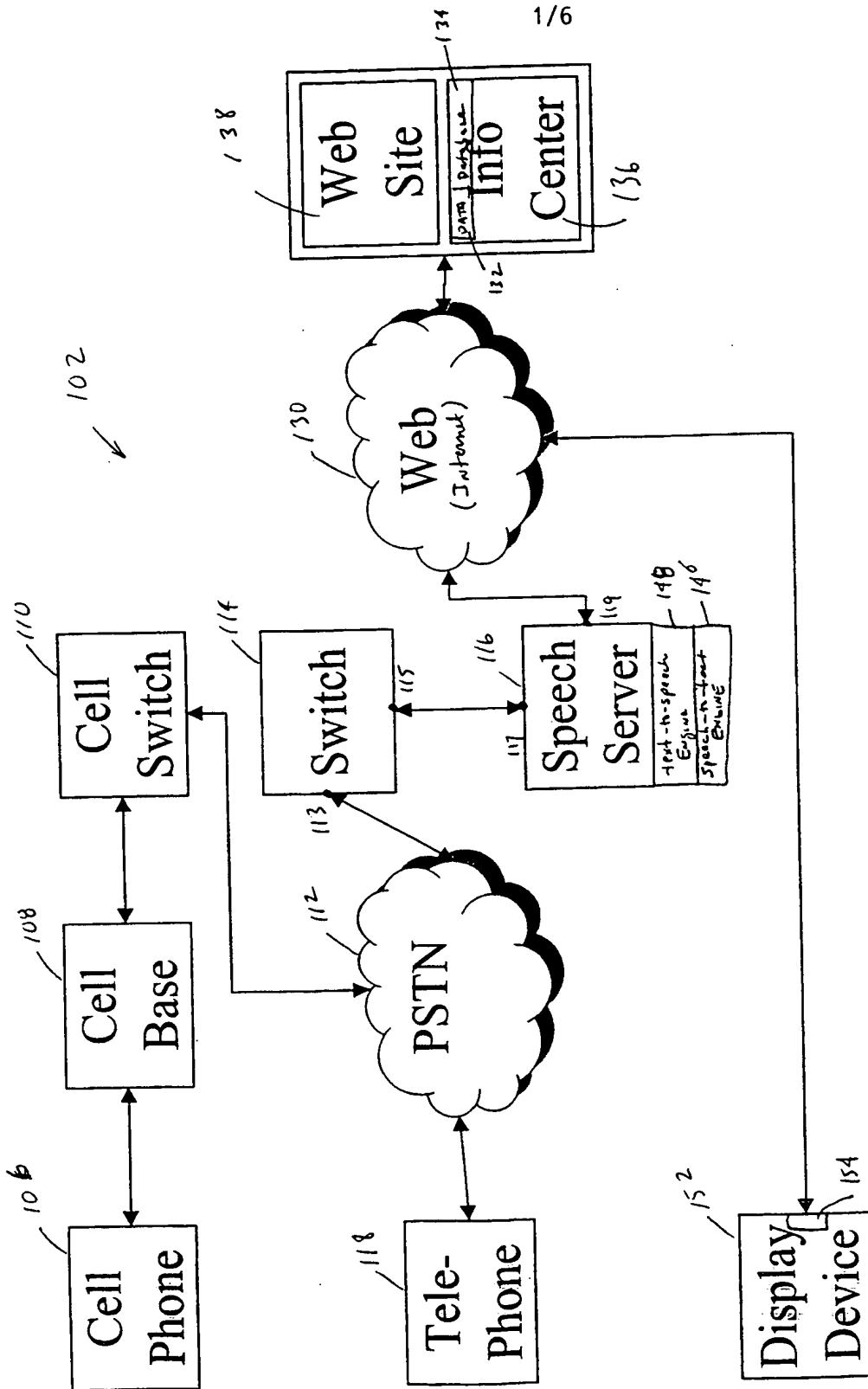


Figure 1:
Top Level System Architecture

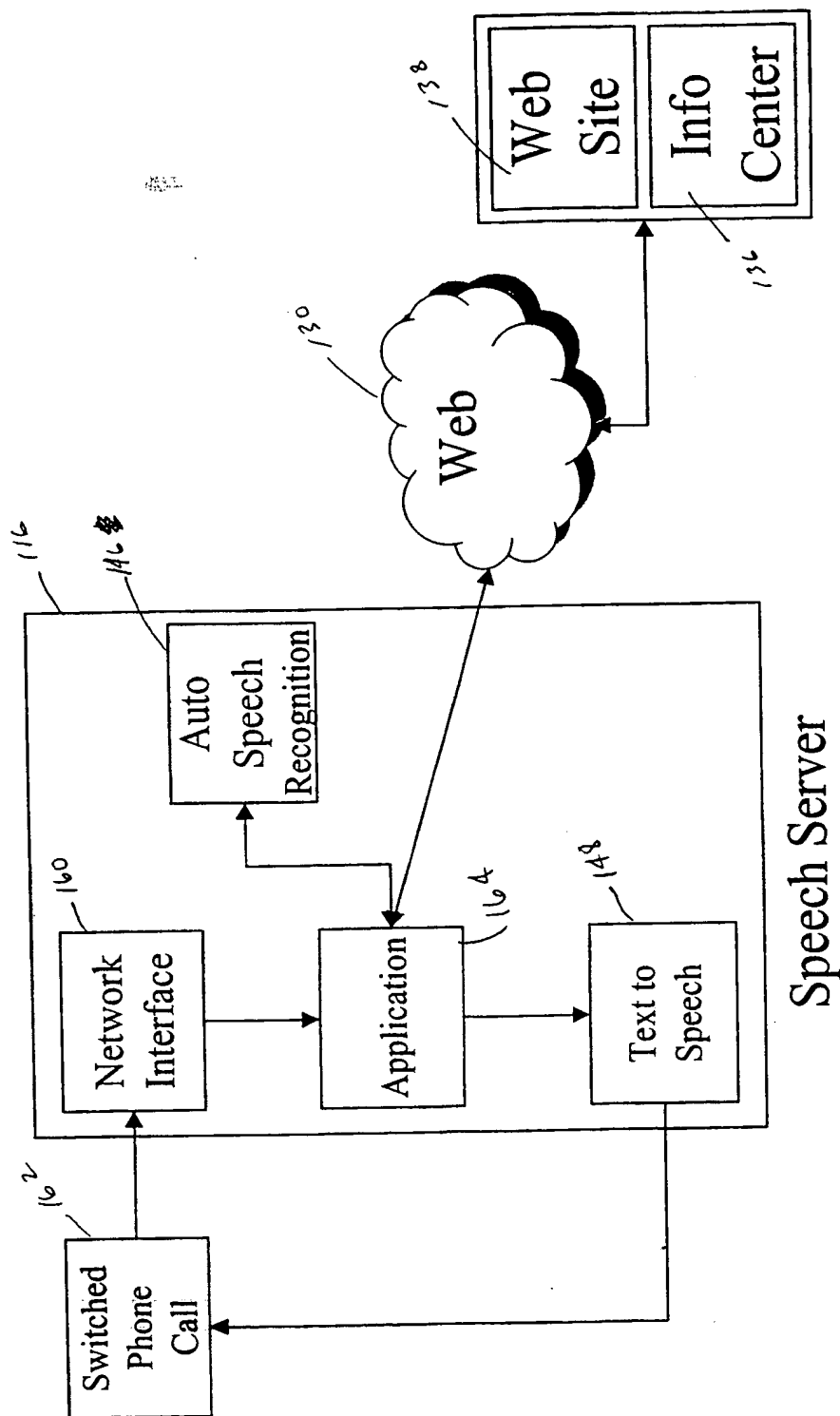


Figure 2:
Speech Server Functions

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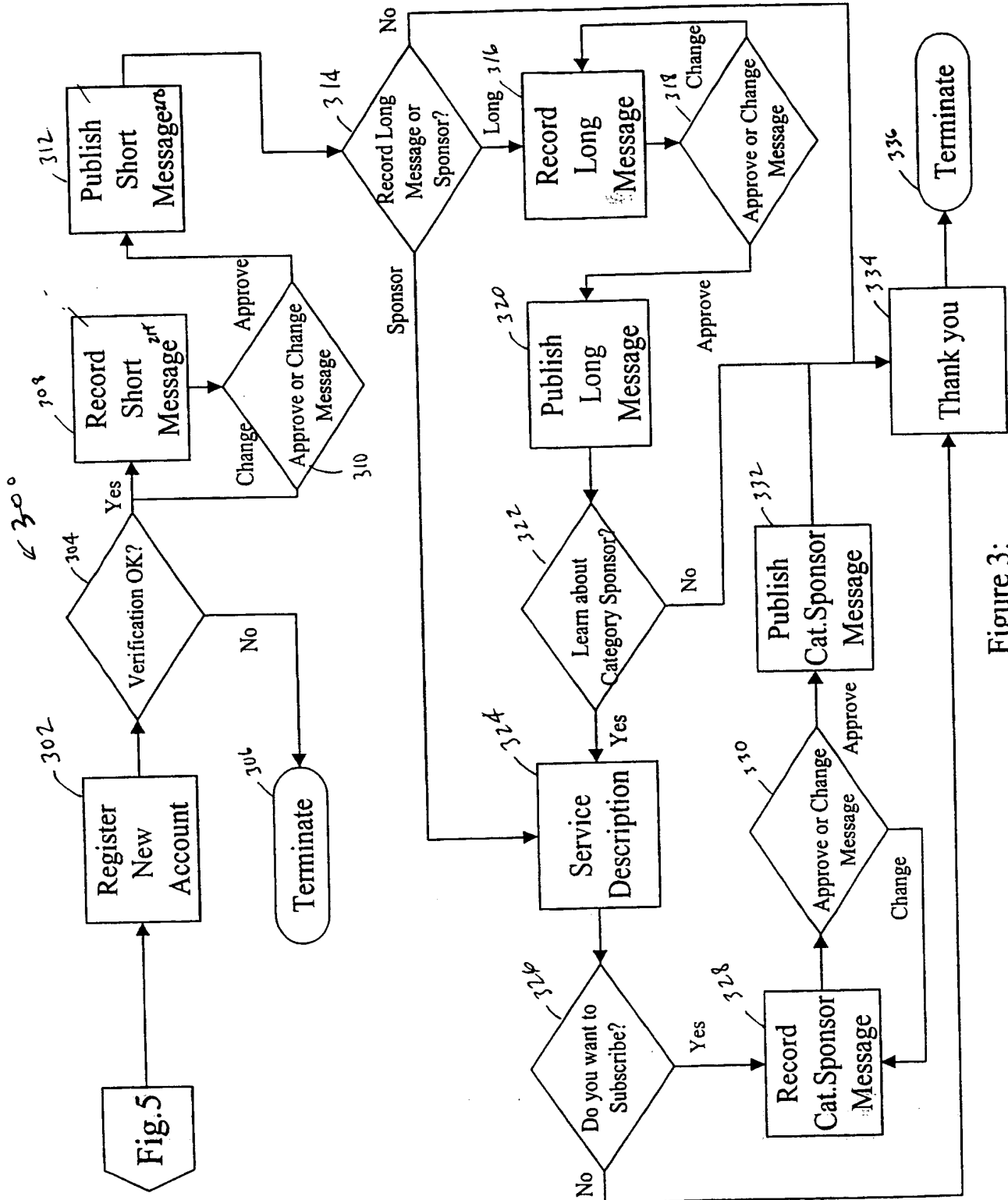


Figure 3:
New Business User Interaction

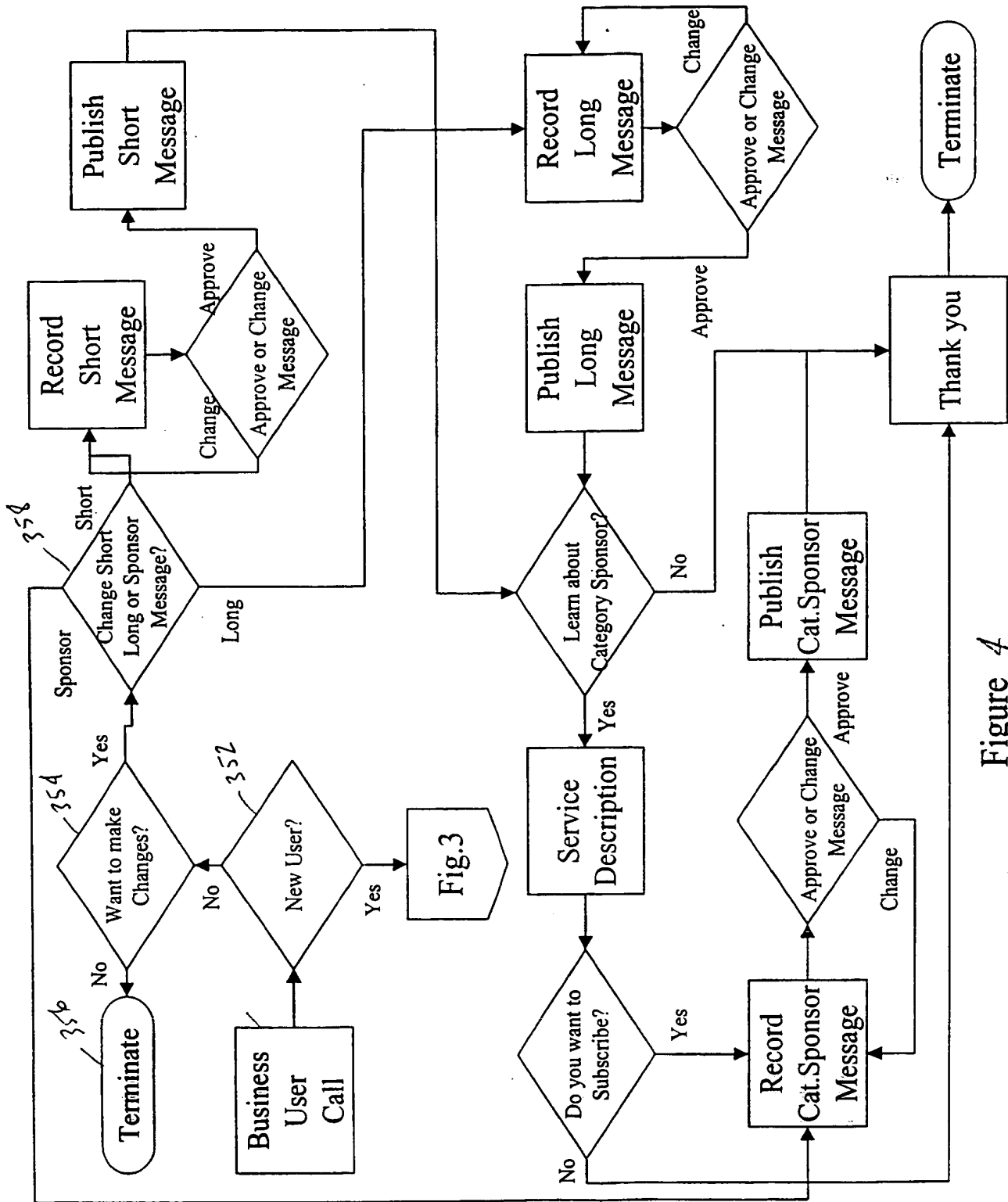


Figure 4
Registered Business User Interaction

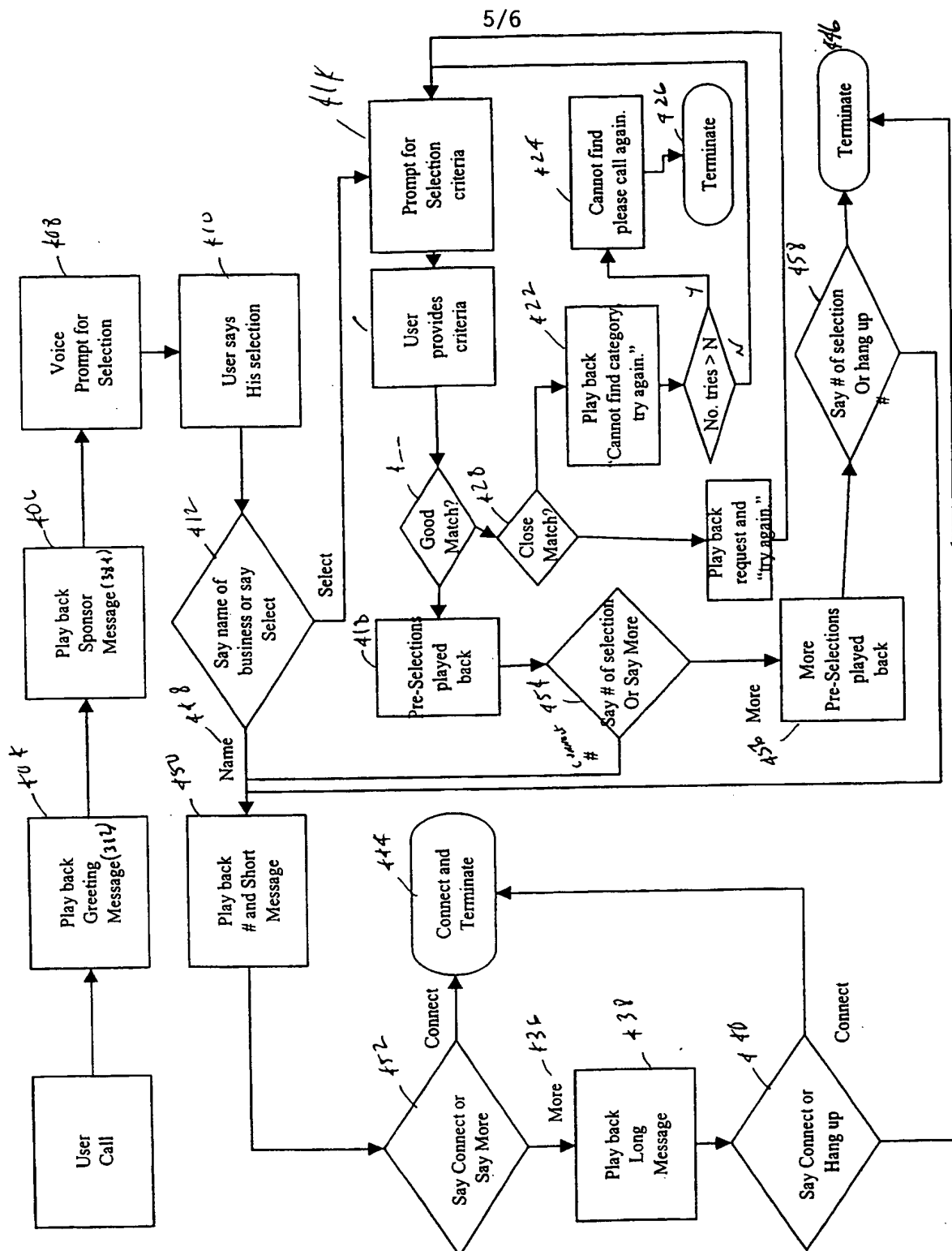


Figure 5
General User Interaction

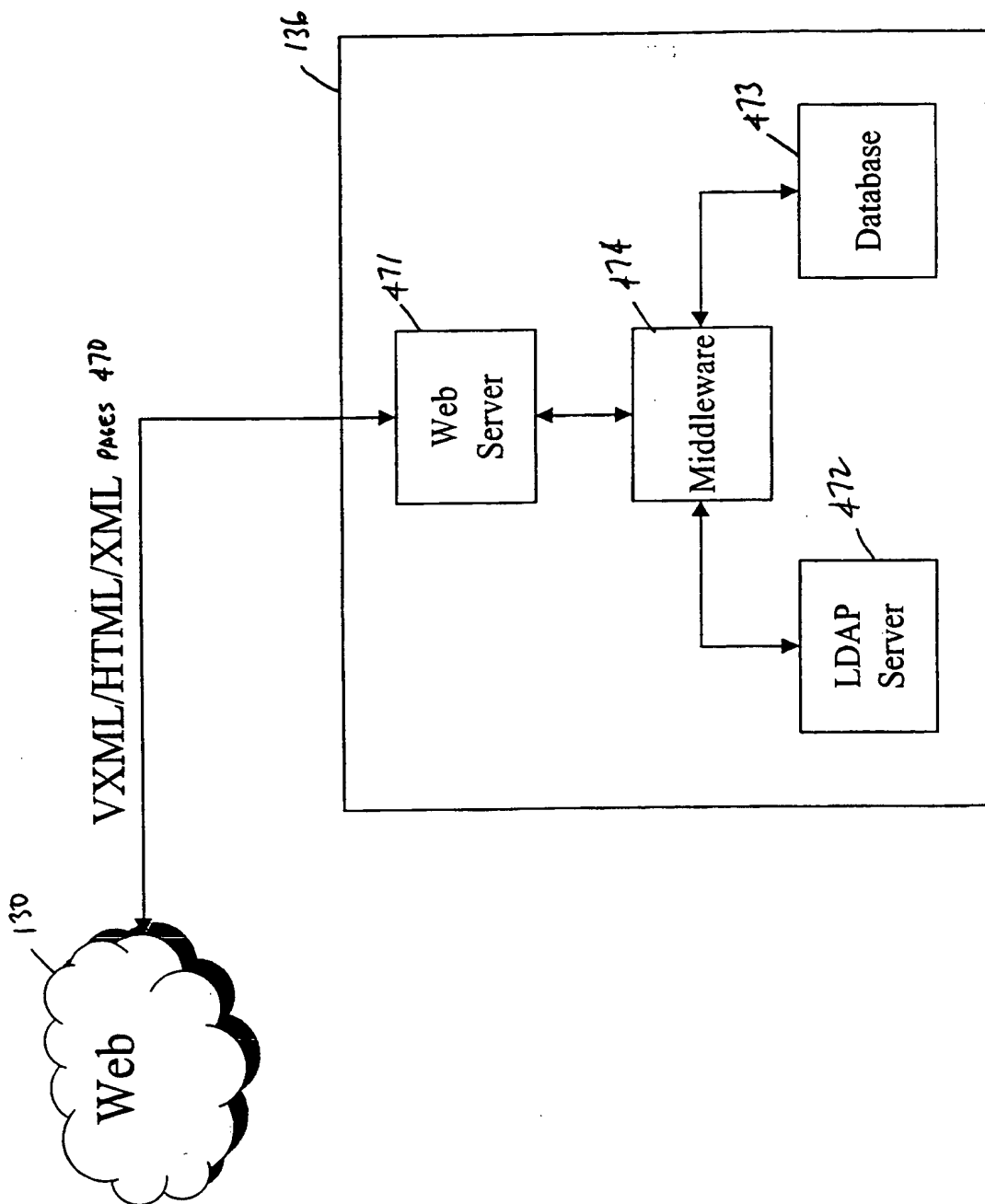


Figure 6: Info Center

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(54) Title: SPEECH INTERACTIVE INFORMATION SYSTEM

(57) Abstract: The invention provides a system (102), method, and business model for an information system and server having business self-promotion, audio coupon, ratings and other features. A business or organization in which consumers call into a service using an ordinary telephone, PC, PDA, or other information appliance, and make requests in plain speech for information for goods and/or services, and the service provides responses to the request in plain speech in real-time. Provides an operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, including database provider storing merchant information; an interface for inputting merchant information in the database and for retrieving and editing the information; and an interface for inputting voice commands and data and for receiving merchant information and processed information from the database in response to the input voice commands and data.

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US 5,903,652 A (MITAL) 11 MAY 1999, FIGS.1, 2, 3E; COL.2, LINE 30-COL.3, LINE 46	1 ----- 2-4
X ----- Y	US 5,903,652 A (MITAL) 11 MAY 1999, FIGS.1, 2, 3E; COL.2, LINE 30-COL.3, LINE 46	1 ----- 2-4
X,P	US 6,055,513 A (KATZ ET AL.) 25 APRIL 2000, COL.8, LINE 33-COL.12, LINE 3; FIG.3	12-15
Y	US 5,884,266 A (DVORAK) 16 MARCH 1999, FIGS.1-4	5-11 AND 16-20

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,991,739 A (CUPPS ET AL.) 23 NOVEMBER 1999, FIGS.3B, 8	5-11 AND 16-20
Y,P	US 6,134,548 A (GOTTSMAN ET AL. 17 OCTOBER 2000, FIG.17; COL.37, LINES 12-32	2-4

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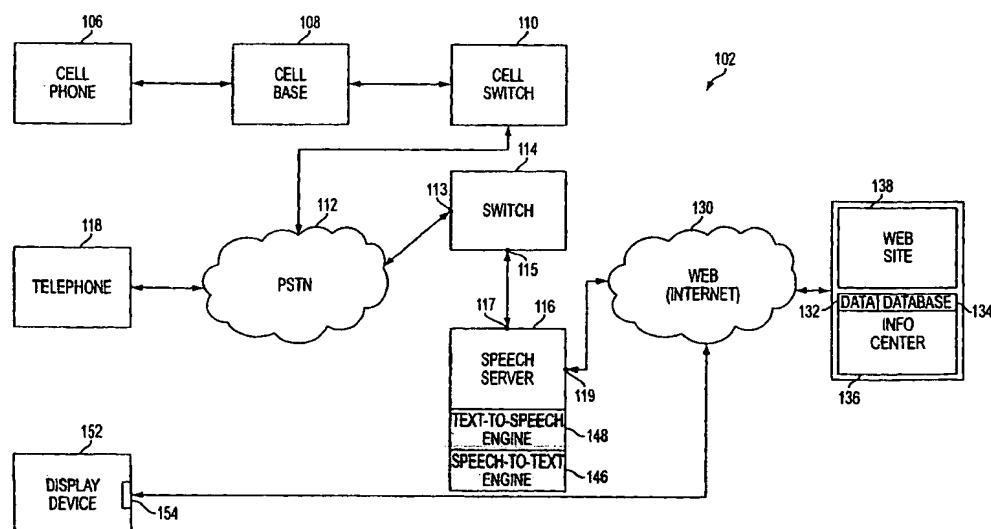
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SPEECH INTERACTIVE INFORMATION SYSTEM

Field of Invention

This invention pertains generally to voice-based or speech-based interactive electronic commerce, and more particularly to systems, methods, and methods of doing business for providing automated interactive information from a business or organization to a consumer in need of goods and/or services. The invention pertains
5 even more particularly to systems, methods, and methods of doing business for providing automated speech driven query and response with business or event self-promotion features relative to businesses and events over ordinary wired or wireless telephone systems, PC systems, Personal Data Assistants (PDAs), and other
10 communication and information appliances and devices.

BACKGROUND

Locating business establishments, such as for example a restaurant satisfying the particular need, has hereto for generally required access to printed directory listings, or
15 more recently access to the World Wide Web using a personal computer. The availability of such references is frequently quite limited at the time the consumer desires to avail themselves of particular goods or services. For example, an out-of-town visitor driving in their automobile and approaching San Francisco might decide to stop and have dinner in a fine Italian restaurant and more particularly might like to have
20 dinner in a fine Italian restaurant located in the particular area of the city. That visitor would likely not have a printed directory in their automobile or mobile access to the internet to search for a restaurant satisfying their current need. Therefore, the visitor would likely either have to stop and asked for recommendations or drive around until a restaurant satisfying their needs had been located. This is clearly inefficient, and the

visitor may not have the dining experienced a expected if the restaurant they happen to see well driving turns out to have poor quality food, poor service, or both.

An analogous dilemma arises for other goods and services, whether provided to the local residents or to a visitor. Frequently information is not available to a consumer when he or she needs such information, and with the proliferation of a fast mobile lifestyle, there exists and need to provide such consumer information with readily available information appliances, such as conventional telephones, site other phones, or other pocket or mobile devices that can provide connectivity to a service at minimum cost.

Frequently such device will have only sparse input/output capabilities. For example, a cellular telephone will typically have only a few display lines presenting text or symbolic data to a user, but has substantial audio input and audio output capability that can be used by the consumer.

Heretofore, speech-to-text conversion has generally been limited to word processing and or computer or control applications as the has required fairly substantial processing power and memory within a computer device. For example, speech to text conversion products made by Dragon Systems generally require an Intel Pentium II or III microprocessor running in excess of 450 MHz and 128 MB of memory. This technology is not available in conventional or mold will telephones at this time. Text-to-speech conversion has been known but has not been utilized to provide an interactive interface between consumers and consumer information from telephone systems.

Furthermore, even for systems which provided some degree of consumer information over the telephone, such systems have either not attempted to generate business revenues through their operation, or have been unsuccessful in generating significant revenue in this manner. In part the lack of revenue success has been due to a low level of business participation in such systems, the inability of a business to control or modify their message in response to short-term business needs or to sell promote their businesses, as well as the lack of a particular incentive for a consumer to par take all of the information offered by the service. In fact, there may frequently have been a cost associated access to conventional information and referral services by consumers, even if only by virtue of the directory assistance by local telephone service providers.

Some conventional systems and methods have been limited to playback of recorded audio or audio playback corresponding to the content of web pages; but such systems have not integrated internet or web-based interactions with voice or telephone based information provision.

5 Therefore, there remains a need for a method of doing business, an information and referral service providing easy access by businesses and consumers, as well as providing business self promotion and consumer feedback features that encourage use, generate revenues, and provide incentives for use by both businesses and consumers.

10 SUMMARY

The invention provides a system, method, and business model for an information system and service having business self-promotion features. In one aspect, the inventive business model is directed to a business in which consumers call into a service using an ordinary telephone, PC, PDA, or other information appliance, and
15 make requests in plain speech for information and positive referrals on goods and/or services, and the service provides responses to the request in plain speech in real-time over the same telephone, PC, PDA, or other information appliance. The business model may further include providing a facility for a business to communicate a self-promotion of the business to the requestor, as well as providing an audio promotional coupon (or
20 other promotional item) to a requestor when the requestor completes a call to a business using the service.

In another aspect, the invention provides an operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, comprising: an information database provider storing
25 merchant information; a merchant interface for inputting merchant information into the database and for retrieving and editing the information; and a consumer interface for inputting voice commands and data and for receiving merchant information and processed information from the database in response to the input voice commands and data. The operating method may provide that the consumer interface comprises a
30 telephone handset, and/or that the consumer also inputs non-voice commands and data from a keypad on the telephone handset. The operating model may also provide that the telephone handset comprises a mobile telephone.

In another aspect, the invention provides a system comprising: a speech-to-text conversion engine converting speech-based input commands and data received from an external device over a communication link into text-based commands and data; a data base storing a plurality of data items; a database search engine searching the database
5 for a particular data item in response to the text-based command and data; a text-to-speech conversion engine generating a speech-based representation of the particular data item identified in the database search; and a speech server for communicating the speech-based representation of the particular data item to the external device.

In another aspect the invention provides audio coupons that operate as
10 incentives for consumers to use the inventive system. In still another aspect, the invention provides system and methods for submitting and retrieving ratings for goods and/or services.

The invention also provides methods, computer software, and computer software program products that interoperate with the inventive systems and methods.
15

BRIEF DESCRIPTION OF THE DRAWINGS

Additional advantages and features of the invention will become readily apparent upon reading the following detailed description and appended claims when taken in conjunction with reference to the following drawings, in which:

20 FIG. 1 is a diagrammatic illustration showing an exemplary embodiment of the inventive system.

FIG. 2 is a diagrammatic illustration showing an exemplary embodiment of speech server functionality.

25 FIG. 3 is a diagrammatic illustration showing an exemplary embodiment of a new business user (merchant) interaction with the inventive system.

FIG. 4 is a diagrammatic illustration showing an exemplary embodiment of an existing registered business user interaction with the inventive system.

FIG. 5 is a diagrammatic illustration showing an embodiment of a general consumer user interaction with the inventive system.

30 FIG. 6 is a diagrammatic illustration showing an exemplary implementation of the inventive directory service on the Web

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

FIG. 1 shows the high level system architecture 102 and consumer user (or caller) 101 access points for a preferred embodiment of the invention. A cellular phone 106 (or other wireless device), standard telephone 118, either an analog (POTS) or digital, can be connected to the architecture 102 using a standard telecommunication link 120, such as a standard telephone line 122, ISDN line 124, cable 126 or DSL line 128. For a cellular phone 106, it is understood that there is a cellular base station 108 and a cellular switch 110 interposed between the cellular telephone 106 and the PSTN 112. The incoming call 130 from the cell phone 106 or the telephone 118 goes through a PSTN 112 and telephone switch 114 and gets picked up by the Speech server 116, which is connected on one side 117 to the telephone switch 115, and on the other side 119 to a computer network 130 such as for example the Internet.

The user (or caller) 101 can access the information or data 132 that resides in a database 134 within the Information Center 136 and the Web Site 138 through interactive voice commands 140 and/or through keypad presses 142 on the caller's 101 device, such as on the cellular telephone 106 or standard wired telephone 118. In a preferred embodiment of the invention, only the caller's voice commands are used. The caller's voice commands 140 are recognized and translated into one of the variations of Voice Extensible Markup Language (VXML, VoiceXML, or VOXML) commands 144 by the Speech Server 116 using a speech-to-text conversion engine 146 and once translated into VXML are used to retrieve the information 132 from the Information Center 136 database 134. VXML is an extension or elaboration on the XML (Extensible Markup Language) standard known to workers in the art and not described in greater detail here. Information concerning the VXML Forum is available on the world-wide-web at <http://www.vxmlforum.org/> and Version 1.0 of the VoiceXML specification dated 07 March 2000 which is hereby incorporated by reference is available in Adobe Acrobat format at <http://www.vxmlforum.org/specs/VoiceXML-100.pdf>.

Once the data 132 is retrieved and transmitted back to the Speech Server 116, the text information from the data 132 is converted to speech using a text-to-speech conversion engine 148 within the speech server 116 and played back to the caller 101 using the caller's device 106, 118. Speech server 116 also generates and plays back (presents) pre-recorded or synthesized menu commands 150 to the caller. The system

architecture connects 102 the information database 134 to the Internet 130 (or other local or global network of computers and/or information appliances) which can also be accessed with a display device 152 such as a personal computer (PC) equipped with a modem 154 (wired or wireless), a smart phone 156, a PDA or palmtop device 158 or
5 any computer or other information appliance or device that can be connected to the Internet (or other local or global network) with the ability to display standard Hypertext Markup Language (HTML) pages or other formats interpretable by the computer 152.

It is noted that although reference is made to several current industry standard data and information formats and protocols, such as HTML, XML, and VXML, the
10 inventive structure and method are not limited to these particular formats and/or protocols or to the versions of these protocols in existence at the time the invention was made as those workers having ordinary skill in the art will appreciate the capabilities and features provided by these formats and protocols may be provided in other ways and that future versions of these formats and protocols will also support the inventive
15 structure and method.

Embodiments of the inventive system may desirably incorporate and utilize natural language speech recognition. In such implementations, the user can naturally speak and the system interprets the user's speech to extract the request or inquiry. The provides additional flexibility for a user as that user does not need to know any
20 particular commands or request rules or syntax. Natural speech processing and artificial intelligence are known in the art and not described in greater detail here.

FIG. 2 shows an embodiment of Speech Server 116 and its functional connectivity to receive a switched telephone call and to interact with the internet 130. Speech Server 116 performs several tasks such as the task of providing a Network
25 Interface 160 to the analog or digital phone network that provides the switched phone call 162, Automatic Speech Recognition (ASR) 146 or speech-to-text conversion (STT), Text-to-Speech conversion (TTS) 148, runs the application or application program 164 that control and manages the phone calls 162 and the Interactive Voice Response (IVR) 166. IVR refers to the interactive voice response which is
30 conventionally a menu driven response provided in response to an input. A user is asked to say something (for example, "Press or say 1 for marketing, press or say 2 for research", etc.) However, the inventors are not aware of any such conventional systems

that provide ASR or text-to-speech in connection with IVR. In one embodiment of the invention, the Speech Server 116 is a personal computer equipped with Dialogic Antares automatic speech recognition boards and other products. Information regarding the Dialogic Antares boards are available from Dialogic Corporation, 1515 Route Ten,
5 Parsippany, NJ 07054-4596 USA and on their web site at http://www.dialogic.com/products/indx_abp.htm.

Operation of the exemplary Speech Server in the system is now described. The incoming call 162 is answered by a network interface card 160, such as for example a Dialogic network interface card (analog or digital). A prompt is played to the caller 101
10 over the caller's device 106, 118 asking the caller to say the selected item 170 from the available selections on a voice or audio menu. When the caller responds to the request, the application 164 passes the voice data to the auto speech recognition block 146, such as may be provided by a Dialogic Antares™ board loaded with an Automatic Speech Recognition (ASR) software. ASR software is available from several sources,
15 including for example from Lernout & Hauspie (L&H) (LERNOUT & HAUSPIE Burlington, MA, Phone: 1-781-203-5000, Fax: 1-781-238-0986, <http://www.lhs.com>) or SpeechWorks (SpeechWorks International, Inc., 695 Atlantic Avenue, Boston, MA 02111, Tel: 617.428.4444, Fax: 617.428.1122, <http://www.speechworks.com>).

A Dialogic Antares board-based automatic speech recognizer (speech-to-text)
20 146 translates the voice data into ASCII text (or another code or symbols) that identifies the spoken words and returns a text or other symbolic representation of the results to the application 164. The application 164 accesses, via for example a T-1 line or faster Internet connection, the database 134 of the Information Center 136. Real-time (or near-real-time), active vocabularies are generated at run-time using the database's 134 ASCII
25 text or symbols. The application uses the ASCII text from the database 134, passes it to a second Antares board 148 running a text-to-speech (TTS) algorithm. The TTS algorithm generates the final voice or audio information that is played to the caller 101.

FIG. 3 shows an example of the general flow of new business user (new merchant) 201 interaction with the inventive system and method according to one
30 embodiment of the invention. A business user 201 is a user that is providing goods or services to consumers 101 where consumers also refer to the previous caller 101. The business user is desirous of having their goods and services made available to

consumers over the inventive system and in promoting their goods and services to consumers.

Once the business user 201 calls, and gets identified as a new business user utilizing a business user registration procedure (see FIG. 5) the business user 201 is asked to say certain business registration information 202, including for example their name 204, name of the business 206, phone number 208, credit card number 210, and/or other pertinent business information 210. Once the registration information 202 is obtained, the system 102 compares the information provided by the new business user 201 with the information that resides in the database 134. The database includes information regarding business so that the authenticity of the attempted registration can be verified with reasonable assurances. In the event that the information does not match, the system 102 may connect to other databases in an attempt to verify the authenticity or otherwise complete the registration. If the information matches, the user registration is completed. If the information does not match, the user is notified with a message providing the new business user with additional options or information, or to recommend trying to say the information again. For example, in one embodiment of the invention, the new business user is prompted with the audio message "Sorry, but the information you have provided does not seem to be correct, say 'again' to start over. You can also hang up and call again, say 'help', or register at our web site www.Talk411.com".

Once the new business user 201 is registered and a password 212 is issued to the business user, then he or she is requested to record a short message 214 that will be heard by the callers 101 who request the business user's phone number 216. Voice recognition can be used (in conjunction with a previously stored authentic voice print of the business user) to authenticate the business user 201 in addition to or instead of the password 212 depending on the quality of the speech recognition technologies used and the quality of the line or other communication link connecting the business user to the system at the time. So called "caller identification" available in some areas may also assist in verifying the identity of the business user where the business user would then be required to call from a registered telephone number.

Once the business user approves the short message 214 just recorded, the recorded short message is published 216 then he or she is requested to provide an

additional longer message 218 that may be or include a special promotion 220, directions to the business location 222, or any other information 224 that will provide additional information to the callers. Both of these short message 214 and long message 218 are available for playback to callers (see FIG. 4) and can also be viewed in text form by those who visit the web site 138 and look up that particular business. The new business user can change either message 214, 218 completely over the phone, or edit it word by word on the PC connected to the web site (see FIG. 4)

It is noted that the messages provided by the business may either be a representation of the business representatives own speech which is preferred so that the quality and character of the voice is maintained, or the message may be computer synthesized speech. The latter being necessary if the business chooses to provide or later modify the message using text input on a computer. As maintaining original speech may be somewhat cumbersome, additional fees may be levied on the business for providing actual speech as compared to synthetic speech. Alternatively, the business user may be able to select from a set of available synthesized voice types so that the voice, even though not provided by the business directly, provides the intended feeling or emotion associated with the business. For example, a restaurant may wish to convey the feeling of romance.

Having described the general operation of the system during a new business interaction, we now describe one particular exemplary embodiment of the new business interaction procedure relative to the flow chart in FIG. 3. Procedure is executed when a determination is made that the business user calling is not a registered business user and a new account needs to be established. As illustrated in FIG. 4, the business user calls the decision is made as to whether the calling business user is a new user or in existing user. Once it is determined that a new account needs to be established, registration of the new business account proceeds as described above wherein the calling business user provides certain business registration information register the new account (Step 302). The registration information provided by the registering new business user must be verified before the new business user interaction can continue. If verification cannot be made, then the interaction is terminated (Step 306), otherwise the business user is prompted to record a short message (Step 308). The business user can then approve the recorded short message 214 or change the recorded short message

until the business user is satisfied with the recorded short message an approves it for publication (Step 310) at which time the short message is published in a voice form and in text form on web site 134 (Step 312).

Business user 201 is then prompted to optional record either no message, and
5 long message 218, or sponsor message 219 (Step 314). Event that the business user to record no additional messages, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336). If the business user chooses to record a long message than the business user records the long message (Step 316) and a given on opportunity to approve the recorded message or change that
10 message until the business user is satisfied with the recorded long message (Step 318). The long message is published (Step 320) and the business user is again the given opportunity to learn about category sponsorship (Step 322). If the business user declines the opportunity to learn about category sponsorship, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step
15 336). On the other hand, if the business user indicates a desire to learn about category sponsorship he or she is provided with the description of the sponsorship service (Step 324) and again asked if he or she wishes to subscribe to the category sponsorship service (Step 326). A category sponsorship message is a message will come up when the caller requests businesses in a category without a specific business name in mind.
20 Then the system will play back the message of the sponsors in that category in a pre-determined order, random order or a dynamically defined order (see explanation relative to the general user interaction of FIG. 5). If the business user declines the opportunity to subscribe, the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336). If the business user indicates a
25 desire to subscribe, he or she is given opportunity to record a category sponsorship message (Step 328) and further opportunities to either approve or change the message until he or she is satisfied with the recorded category sponsor message (Step 330). The category sponsor message is then published (Step 332) and the business user is thanked for providing the information (Step 334) and the interaction terminates (Step 336).

30 As illustrated in the flow chart diagram of FIG. 4, the procedures associated with the repeat business user interaction are substantially the same as, though not identical to, those just described for a new business user interaction. The differences

primarily concerned how the initial phase of the business user call to the system is handled. For in existing registered business user interaction, the system receives the business user call and determines if it is a new user or an existing registered user (Step 352). If the system determines that it is a new business user, than the procedure already
5 described relative to FIG. 3 is executed. However, if the system determines that an existing registered business user is calling into the system, it presumed step the existing business user wishes to make changes to one or more of the items of registration information or to one or more of the recorded messages (Step 354). If the business user decides after placing the call that he or she does not wish to make changes than the
10 interaction terminates (Step 356), otherwise the business user is asked whether he or she wishes to change the s tune hort message, the long message, or the sponsor message (Step 358) and given opportunity to change one or more of these messages. These messages are the Long, Short and Sponsor messages that he may have already input into the system via a phone or a personal computer of other information appliance. The
15 process for recording, changing, approving, and publishing each of these messages is the same as already described relative to FIG. 3, and the business user it is similar given additional opportunities to learn about, subscribe to, and record messages pertinent to additional services provided by the system.

In order to make the user interface more satisfactory, additional steps can be
20 introduced or some of the shown steps can be deleted from the interaction flow. For example, after the Business User makes changes to the short message, he can be prompted to see whether he wants to make any changes to the long or the sponsor messages. An example of the deletion of a step can be where the user is initially prompted to find out whether he wants to make changes and gets told that he can say
25 anytime "make changes" and trigger the menu options. The amount of consolidation largely depends on the speech recognition technologies employed and the key words chosen for the speech recognition vocabulary.

In addition, other embodiments of the invention may largely or entirely eliminiae the particular command and data extraction procedure set forth in the above described
30 procedures and replace them in all or in part by a natural language recognition and extraction procedure that either listens to the user's request in free form speech and extracts commands and/or data from the user's speech, or extracts the commands and/or

data in part and intelligently asks additional questions of the user for any added information. In this sense, the inventive system and method provide logic for conducting a dialog or conversation with the caller. Essentially the same or substantially the same information is exchanged between the user and the system but
5 with a more flexible interface that is more familiar and enjoyable to the user.

Those workers having ordinary skill in the art in light of the description provided here will appreciate that the procedures described for existing registered users as well as for new business users may be modified to provide somewhat different options at each stage all the interaction or to provide different ordering of the options.
10 Therefore, the interaction described here are merely exemplary of the type of business user to system interaction desirable in an implemented system, but does not limit the inventive system or method to these particular interaction schemes or procedures.

FIG. 5 shows an exemplary embodiment of the General User interaction 402. Once the consumer user 101 calls, a greeting message 382 is played back (Step 404)
15 such as "This is TALK411, your best source for local information" followed by a sponsor message 384, such as for example "brought to you by Dialsurf, bringing the web to your phone" (Step 406). This sponsor message is typically a paid message by a sponsor. Then the voice menu 386 is played back to the caller (Step 408), such as "Please say your selection: Restaurants, Lawyers, Auto dealers, etc.". Once the
20 consumer user says one of the menu items (Step 410), then he or she is prompted with a request message (Step 412), such as "Say the name of the business or say 'select'".

If the consumer user 101 says "select" or another word that indicates to the system that he or she (the consumer user) should be prompted with a list of pre-selected business names, he or she is prompted with a request to specify selection criteria (Step
25 414). This criteria 388 is pre-determined and varies according to the type of business. In the case of restaurants for example, it may be "type of cuisine, city and zip code". In case of lawyers, it may be for example "type of practice, city and zip code". Once the user says the criteria 388, then the system 102 tries to match the requested category or criteria 388 to the closest category or criteria stored in the database 134. If the match
30 is good (according to some predefined rules or decision algorithm or procedure), then the system will play back a number of business names pre-determined by the system (Step 418). These names can be picked from the database 134, in the requested

category, in a pre-determined fashion, randomly or based on a dynamically changing criteria or some fixed set of rules.

The inventive system, method, and business model or operating method is applicable to a broad variety of business and merchant types including but not limited
5 in any way to: restaurants, physicians and surgeons, auto parts, auto repair and service, pizza, auto dealers, department stores, attorneys/lawyers, dentists, hospitals, insurance, beauty salons, banks, plumbing contractors, florists, as well as many other types of businesses and services.

One example of pre-determined way is for the subscribed businesses to pay the
10 corresponding fees to be included in the top category (Category #1), second category (Category #2), and the like for a specific time period. An example of random procedure can be, as the name implies, based on a random number generator that picks a database record in the category requested. An example of dynamically changing criteria is when users rate the businesses on a real time or periodic basis and which ever business is
15 rated highest gets to be heard as the #1 (first named), #2 (next named), #3 (third named), and the like down a hierarchical list.

After the pre-selections are played back, the caller is invited to say the 'number of the menu selection' or to say 'more' (Step 454), if the caller responds with the number of the selection, the number and a short message is played back (Step 450) and
20 he or she gets prompted with a questions such as "Say connect or 'more' for additional information" (Step 452). If the caller says "connect", the caller is connected to the phone number that was found (Step 444). If the caller says "more" (Step 436) then the pre-recorded Long Message is played back (Step 438) with a question such as "Say connect or just hang up your phone" (Step 440). Based on the caller's selection, either
25 the caller gets connected to the phone number (Step 444), or gets disconnected to the service (Step 446). Of course, different rules may be applied to permit the user to input different choices, however, in some situations it is desirable to have a user call in again when they have rethought their need rather than to tie up the connection for an extended period of time.

30 If the caller responds by saying 'more', then additional pre-selections are played back to give the caller more and different choices (Step 456). The caller may then either say the number of one of the new selections (Step 458) or terminate (Step 446).

In some instances, the caller may be permitted to keep repeating the request for more choices until all choices available in the data base (or a predetermined number of such choices) have been presented to the caller. In either event, if the caller does not like or select one of the available choices, the call terminates (Step 446).

5 If there is no match (Step 420), an answer such as "sorry, but we cannot find this category in our list, try again" is played back (Step 422). After a predetermined number of tries (for example, after two tries) if there is no match, the system will say something like "sorry, we could not find a business that matches your request, please call us again" (Step 424) and terminate the call (Step 426). If there is a close match,
10 the system will play back the match to verify the request for further action (Step 428).

 Once the caller chooses the business by saying its name or menu number (Step 430), the number and a short message is played back (Step 450) and he or she gets prompted with a questions such as "Say connect or 'more' for additional information" (Step 452). If the caller says "connect", the caller is connected to the phone number that
15 was found (Step 444). If the caller says "more" (Step 436) then the pre-recorded Long Message is played back (Step 438) with a question such as "Say connect or just hang up your phone" (Step 440). Based on the caller's selection, either the caller gets connected to the phone number (Step 444), or gets disconnected to the service (Step 446).

20 If the caller says the name of a particular business instead (Step 448), then the phone number and the Short Message (refer to FIG. 3) will be played back (Step 450) with an additional prompt (Step 452), such as "Say 'connect' or 'more' for additional business information (the Long Message per FIG. 3). Once the Long Message is played back (Step 438), the user will be prompted once more whether the connect or terminate
25 the call (Step 440).

 FIG. 6 shows the implementation of the Directory Service of the info center 136 on the Web 130, where the Web Server 471 serves VXML or HTML/XML pages 470, the LDAP Server (Lightweight Directory Access Protocol Server) 472 runs over TCP/IP and provides quick response to high volume lookup to the Database 473. The
30 Middleware 474 is the layer of software that integrates operations of the Web Server, LDAP Server, and the Database (or any additional software such as Transaction

Server). LDAP Servers and operation are known in the art, and is described, for example as of 23 March 2000, at:

<http://www.umich.edu/~dirsvcv/ldap/doc/guides/slapd/1.html>.

An example of a Web Server for high volume application such as TALK411 is the Microsoft Internet Information Server (IIS). Microsoft IIS runs on Windows NT Server. LDAP also runs on Windows NT® 4.0 using Service Pack 4 or later, Windows® 2000, or Windows 95/98. All systems desirably have TCP/IP (or an equivalent capability) installed. Additional information relative to Microsoft products, including Microsoft IIS is available on their website as of 23 March 2000 at http://msdn.microsoft.com/isapi/msdnlib.idc?theURL=/library/psdk/ldap/ld_about_7euh.htm

Other optional but desirable features may also be provided. For example, one desirable promotional feature involves issuing an audio coupon to a consumer user of the inventive system. In one embodiment, a consumer user is issued an audio coupon entitling the user to a promotion. Typically, such promotion would entitle the user to a discount to be applied to the item or service purchased when the consumer user connects using the inventive system and method. This discount, for example 10 percent off, would only be available to the consumer user when using the inventive TALK411 system and is therefore an enticement for a consumer user to use the inventive system rather than dealing with the business through conventional means. Other promotions might involve a buy one get one free offer, of free drink with order of food type offer, or any other the other variety of promotional offers typically made in the retail trade between merchants and consumers.

The audio coupon may be provided in a variety of ways. For example, the business would become aware that the consumer user contacted the business using the inventive TALK411 system and automatically give the consumer user a discount (or other promotional item) when the your was placed. Alternatively, the consumer user might be given a coupon code which could only be available to a consumer user who ate-utilize the inventive system, and a consumer user would provide this code to the merchant upon connection. This code might be generic to the business or particularized to that specific transaction. Therefore, in addition to be self promotion aspects of the business model, the optional use of audio coupons also provides considerable business advantages. In one embodiment of the invention, the system inserts a message to the

merchant after the call has been connected to identify the caller as a valid service user and to validate the audio coupon.

In a preferred embodiment, the use of audio coupons is integrated with the world wide web or internet in that the audio coupons may be identified, stored to, retrieved
5 from, or otherwise processed using the businesses or the inventive services web site. In this way, the consumer user is not limited to using the coupon at the time it was earned, but may instead be collected for later redemption. This also affords an opportunity to obtain a printed copy of the coupon for use at any later time.

In yet another embodiment, the audio coupon or a coupon derived from that
10 coupon may be delivered to a personal data assistant (such as for example, an email enabled PALM VII) so that the PDA stores the coupon and serves as a medium for displaying the coupon the business, merchant, or organization.

Independent of how the coupon is delivered, one aspect of the inventive system, method, and business model is to collect money or other revenue in what ever form for
15 each coupon delivered. It is also advantageous to collect money or other revenue for each coupon redeemed either as a fixed amount per coupon or as a portion (such as a percentage) of the sale, or both. Collection of revenue for each coupon delivered is separate from collection of revenue for each redemption or sale.

In a further embodiment, the system has geographical context provided by a
20 known location of the caller. For example, it is expected that mobile or cellular telephones will have capability to self locate, either using internal satellite-based Geographical Positioning System (GPS) means or by using various schemes known in the art for determining (or estimating) the location of a cellular telephone based on proximity to cellular base stations, hand-off's to base stations, and similar techniques.
25 In any event, the inventive system provides for geographically-based recommendations, geographically-based promotions, as well as for geographically based audio coupon delivery. Here the geographic proximity may be established according to some set of rules which may for example depend upon the density of business establishments in the local area. However, in one embodiment the geographically directed audio coupons
30 pertain to business within one to a few blocks of the callers location, in other embodiments to a mile or two, and in still other embodiments to the region of the city or town.

In yet another optional feature, consumer user's who call into the inventive service will be able to rate the particular business after they have utilized the businesses goods or services. For example, a consumer user having been referred to a restaurant using inventive system can later call in using a toll-free or free local phone number and provide feedback, such as in the form of a rating, relative to their experience. These ratings would then be compiled and made available to the local businesses. Hopefully such feedback would encourage the businesses to either maintain their high quality of service or to improve the quality of their service and/or goods in response to the consumer user's rating. In another embodiment, these ratings were also serve as an additional information source for consumer user's and would be available either or telephone or on Internet based website. The business establishment having demonstrated a particularly high-level of goods or service based on these ratings would be placed into a category of highly rated businesses, such as "BayHits", would be available to the consumer user during his or her call into the system. So for example, when the user calls in to request "Italian restaurant in Palo Alto", if in one of the candidate restaurant played back to the caller happens to be a "BayHit" then that restaurant would be indemnified as such. For example, the caller might receive a message "Il Fornaio - a BayHit". Alternatively, consumer user may be able to request "BayHit Restaurants" and receive only a list of restaurants satisfying the BayHit criteria. In some embodiment of the invention, the rating or BayHit feature may be provided free to the businesses while in an alternative preferred embodiment businesses falling within the highly rated or "BayHit" category would be charged the nominal fee. Those workers having ordinary skill in the art in light of description provided here will appreciate that this rating and promotion scheme may be implement in a variety of ways and that the particular descriptions provided here are merely exemplary of the more general method. The ratings may alternatively or additionally be provided on an Internet website (such as <http://www.bayhits.com> so that information obtained from caller's using inventive system method would be available to other individuals and businesses as well.

Some of the steps in this procedure can be changed, left out, or combined to make the user interaction to be a satisfying experience as will readily be understood by workers having ordinary skill in the art in light of the description provided here.

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The

5 embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims appended hereto and their equivalents. All publications and

10 patent applications cited in this specification are herein incorporated by reference as if each individual publication or patent application were specifically and individually indicated to be incorporated by reference.

CLAIMS

1. An operating model for a telephone-based audio-interfaced goods and services information and referral service having merchant self-promotion features, comprising:
5 an information database provider storing merchant information;
 a merchant interface for inputting merchant information into said database and for retrieving and editing said information; and
 a consumer interface for inputting voice commands and data and for receiving merchant information and processed information from said database in response to said
10 input voice commands and data.
2. The operating method in claim 1, wherein said consumer interface comprises a telephone handset.
3. The operating model in claim 2, wherein said consumer also inputs non-voice commands and data from a keypad on said telephone handset.
- 15 4. The operating model in claim 2, wherein said telephone handset comprises a mobile telephone.
5. A system comprising:
 a speech-to-text conversion engine converting speech-based input commands and data received from an external device over a communication link into text-based
20 commands and data;
 a data base storing a plurality of data items;
 a database search engine searching the database for a particular data item in response to said text-based command and data;
 a text-to-speech conversion engine generating a speech-based representation of
25 said particular data item identified in said database search; and
 a speech server for communicating said speech-based representation of said particular data item to said external device.
6. The system in claim 5, further comprising the external device, wherein said
30 external device comprises a voice/speech input device.
7. The system in claim 5, further comprising the external device, wherein said external device comprises a telephone.

8. The system in claim 5, further comprising the external device, wherein said external device comprises a device selected from the group consisting of a personal computer, notebook computer, personal data assistant (PDA), information appliance, or combination thereof.

5 9. The system in claim 5, wherein said communication link comprises the internet.

10. The system in claim 5, further comprising means for communicating and validating a promotional audio coupon.

11. The system in claim 5, further comprising means for receiving rating inputs from users and for providing processed ratings inputs to consumers.

10 12. A business model for a business in which consumers call into a service using an ordinary telephone and make requests in plain speech for information and positive referrals on goods and/or services, and the service provides responses to the request in plain speech in real-time over the same telephone.

13. The business model in claim 12, further including providing a facility for a
15 business to communicate a self-promotion of the business to the requestor.

14. The business model in claim 12, further including providing an audio promotional coupon to a requestor when the requestor completes a call to a business using the service.

15. The business model in claim 12, further including providing an audio
20 promotional coupon to a requestor when the requestor completes a call to a business using the service.

16. A method comprising:

receiving a speech utterance from a user from a communication device;

converting the speech utterance to text and extracting commands and optional

25 data from said converted text;

searching a database for a particular data item in response to said text-based command and data;

generating a speech-based representation of said particular data item identified in said database search; and

30 serving said speech-based representation of said particular data item to said communication device.

17. The method in claim 16, wherein said communication device comprises a voice/speech input device.

18. The method in claim 16, further comprising communicating and validating a promotional audio coupon to the user at the time said speech-based representation is

5 served to said communication device.

19. The method in claim 16, further comprising receiving rating inputs from users and for providing processed ratings users in response to said speech utterances..

20. The method in claim 16, wherein said received speech utterance comprises natural human speech, and said converting comprises natural language speech

10 processing to extract said commands and data.

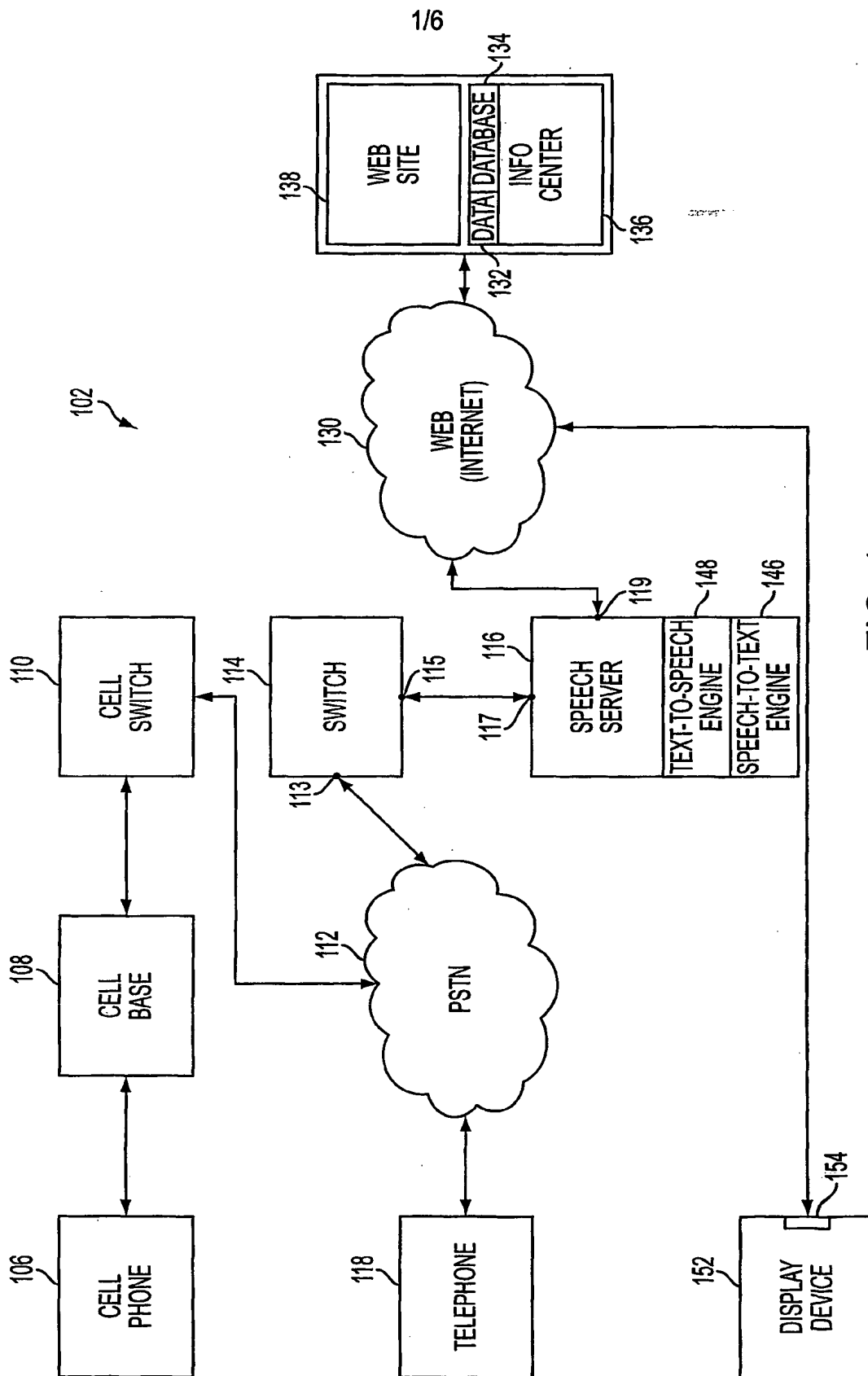


FIG. 1

2/6

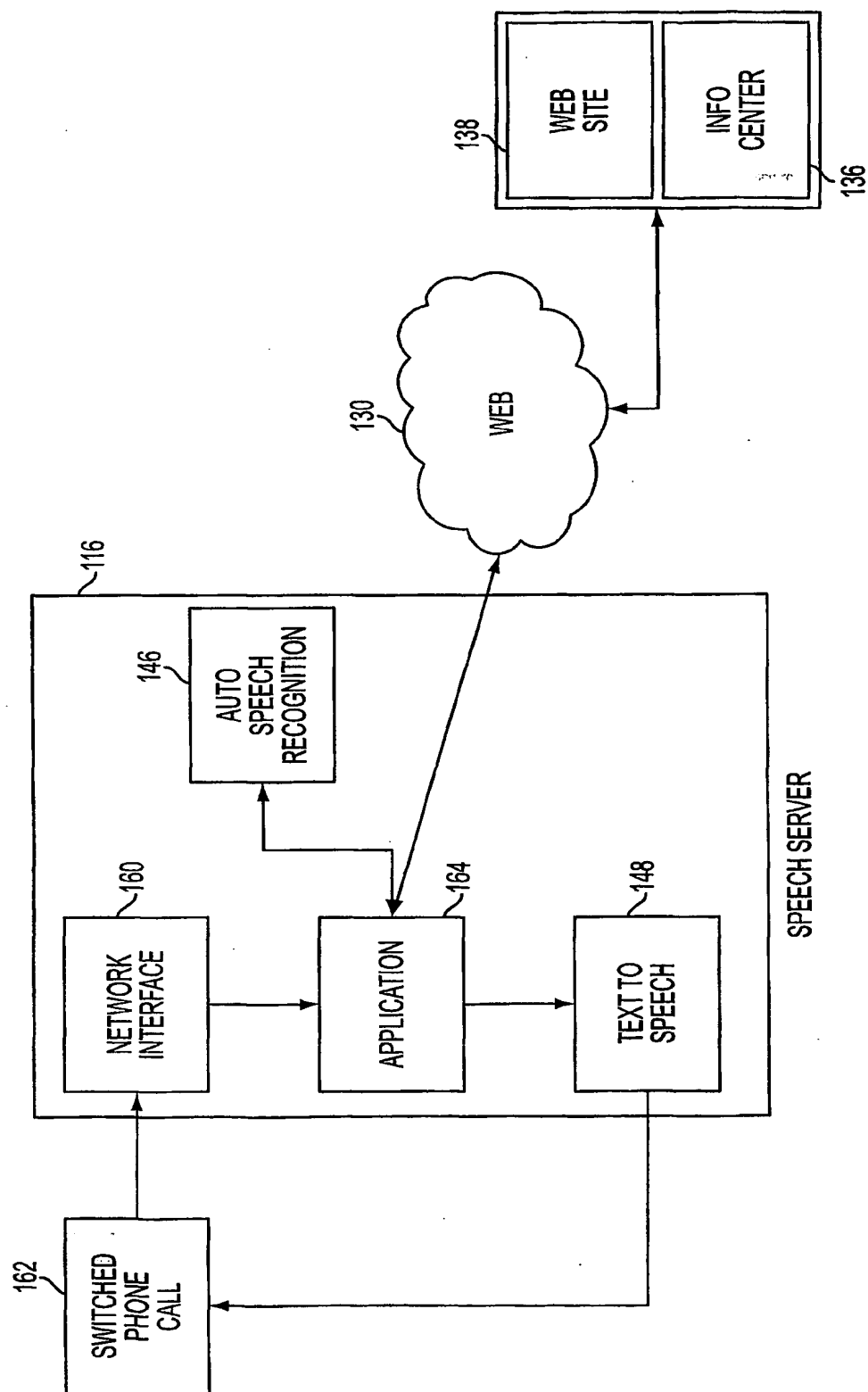
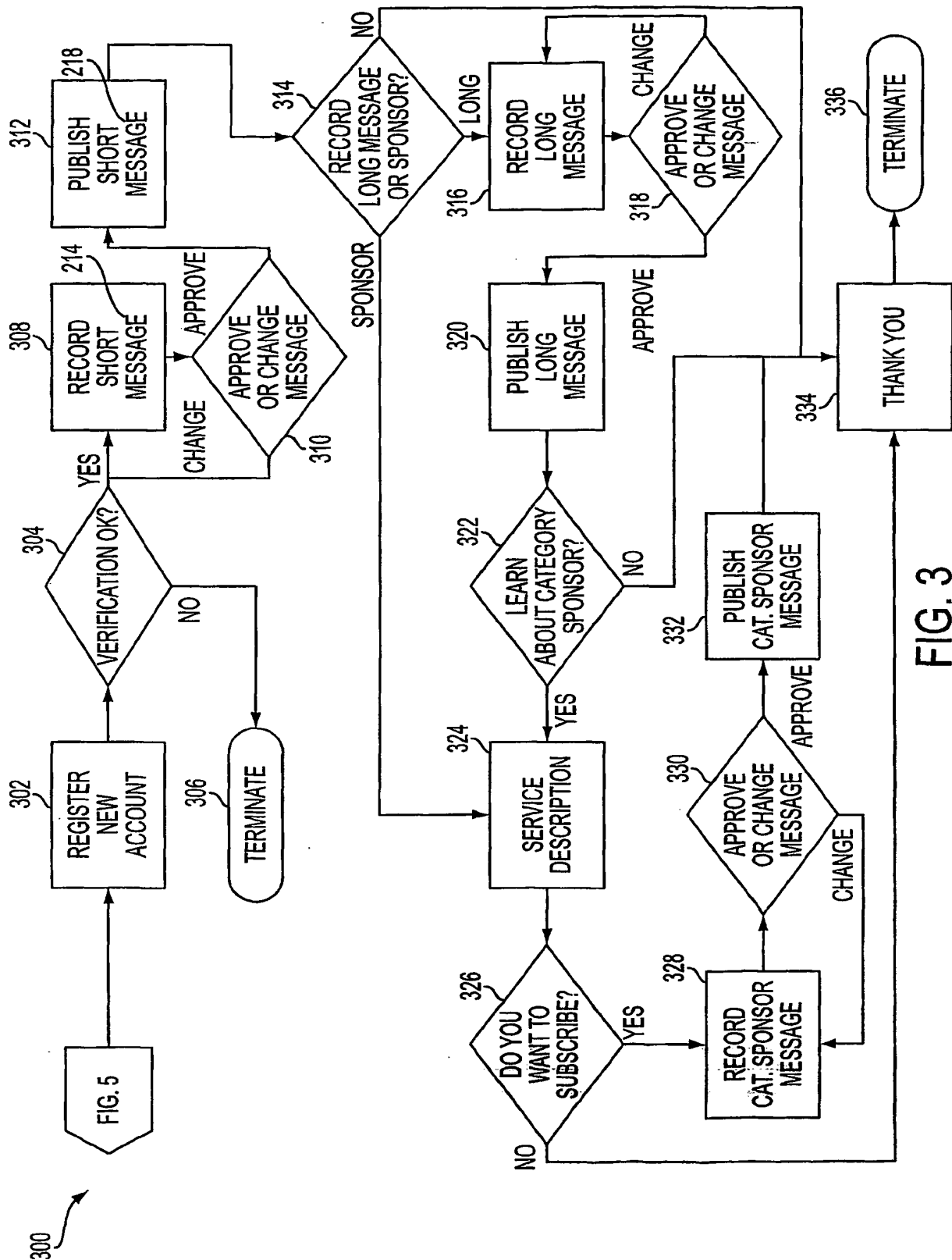


FIG. 2

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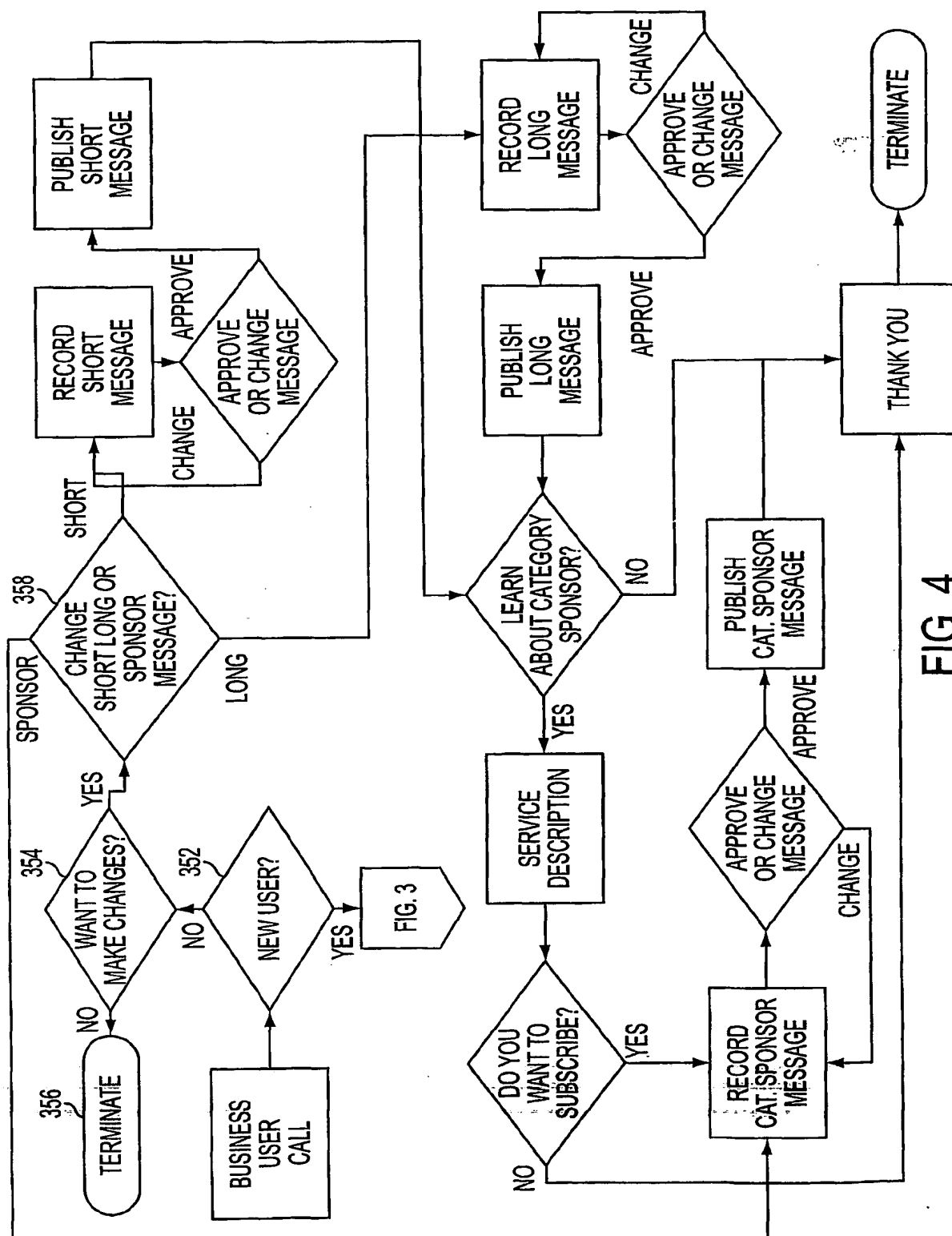


FIG. 4

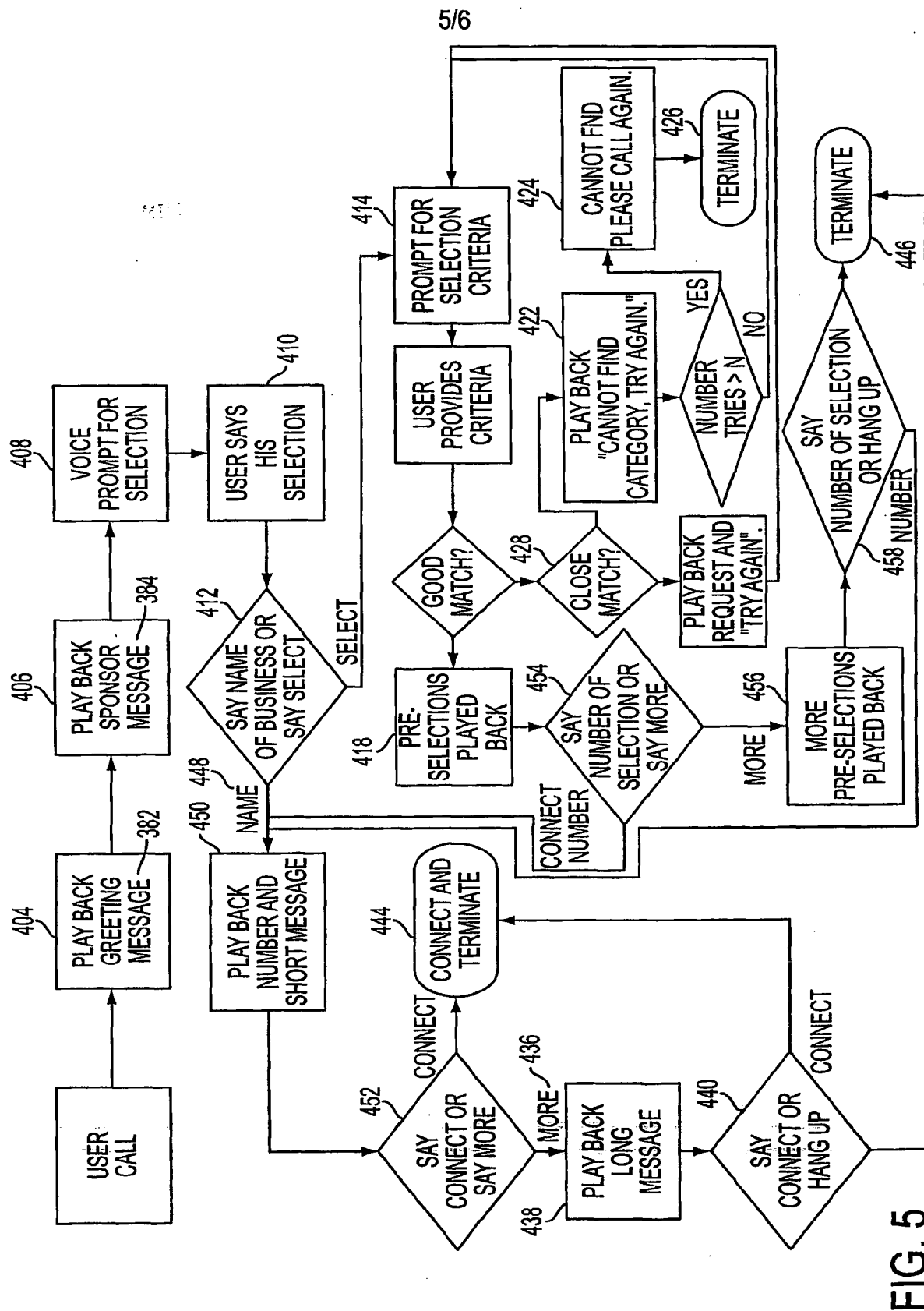


FIG. 5

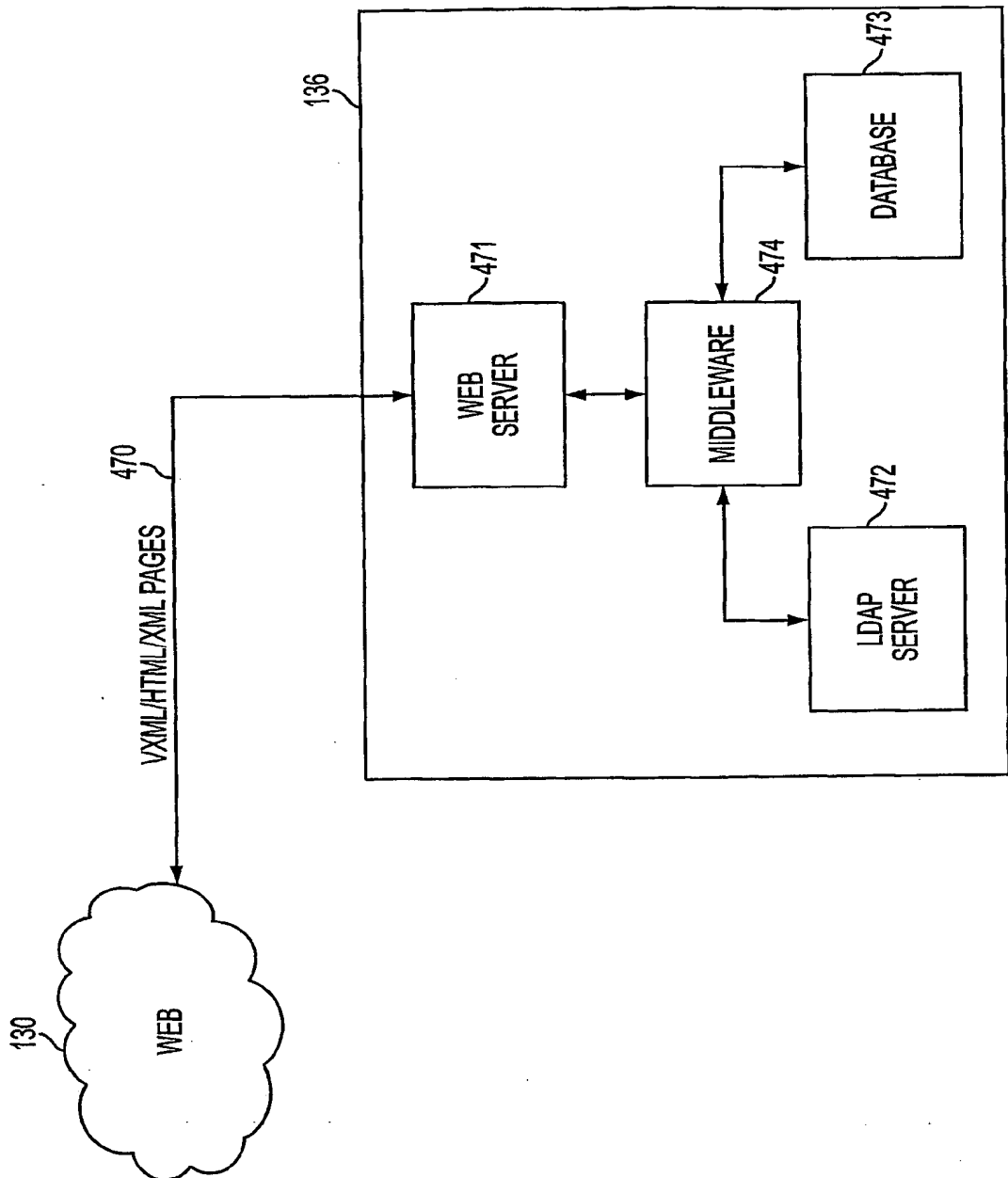


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/09667

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : G10L 15/22 US CL : 704/246, 270, 272, 275 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 704/246, 270, 272, 275 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WEST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US 5,903,652 A (MITAL) 11 MAY 1999, FIGS.1, 2, 3E; COL.2, LINE 30-COL.3, LINE 46	1 ----- 2-4
X ----- Y	US 5,903,652 A (MITAL) 11 MAY 1999, FIGS.1, 2, 3E; COL.2, LINE 30-COL.3, LINE 46	1 ----- 2-4
X,P	US 6,055,513 A (KATZ ET AL.) 25 APRIL 2000, COL.8, LINE 33-COL.12, LINE 3; FIG.3	12-15
Y	US 5,884,266 A (DVORAK) 16 MARCH 1999, FIGS.1-4	5-11 AND 16-20
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
"	Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 31 JULY 2001		Date of mailing of the international search report 20 SEP 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer WILLIAM KOBZUSH Rugenia Zogor Telephone No. (703) 305-6237

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INTERNATIONAL SEARCH REPORT**International application No.**
PCT/US01/09667**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,991,739 A (CUPPS ET AL.) 23 NOVEMBER 1999, FIGS.3B, 8	5-11 AND 16-20
Y,P	US 6,134,548 A (GOTTSMAN ET AL. 17 OCTOBER 2000, FIG.17; COL.37, LINES 12-32	2-4

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